PORT NOLA
THE PORT OF NEW ORLEANS

Mississippi River
Intermodal Terminal Improvements
Electric Rubber Tire Gantry Crane Procurement

Requisition No. 071952

Work Order No. 1-109

Prepared by
AECOM Technical Services, Inc.
1555 Poydras Street, Suite 1860
New Orleans, Louisiana 70112

1350 Port of New Orleans Place
New Orleans, Louisiana 70130

Board of Commissioners of the Port of New Orleans
Post Office Box 60046 New Orleans, Louisiana 70160
Tel: 504-528-3296 Fax: 504-528-3278

OCTOBER 22, 2014

BOARD OF COMMISSIONERS
OF THE
PORT OF NEW ORLEANS

MISSISSIPPI RIVER INTERMODAL TERMINAL IMPROVEMENTS

ELECTRIC RUBBER TIRE GANTRY CRANE PROCUREMENT

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OCTOBER 22, 2014

CONTRACT FOR MATERIAL AND LABOR

FOR THE

MISSISSIPPI RIVER INTERMODAL TERMINAL IMPROVEMENTS ELECTRIC RUBBER TIRE GANTRY CRANE PROCUREMENT

This Agreement, (hereby after the Agreement or Contract), made and entered into in multiple counterparts, effective on the date last executed by a party hereto, by and between:

BOARD OF COMMISSIONERS OF THE
PORT OF NEW ORLEANS (hereby after "Board")

and

(NAME OF CONTRACTOR) (hereby after "Contractor")

WITNESSES:

That, for and in consideration of payments hereinafter stipulated to be made to Contractor by Board, Contractor and Surety (hereinafter appearing) hereby agree and bind themselves jointly, severally and in solido at their own cost to furnish all labor and materials, equipment, transportation and other facilities, necessary and requisite to perform, construct, complete and deliver in a substantial and workmanlike manner, to the entire satisfaction of the Board representative, hereinafter called "Engineer," all of the work called for, embraced and described in the Plans and Specifications of Board, and according to the Bid of Contractor, for the construction of

MISSISSIPPI RIVER INTERMODAL TERMINAL IMPROVEMENTS
ELECTRIC RUBBER TIRE GANTRY CRANE PROCUREMENT (hereby after E-RTG Crane(s) or Crane(s))

in the manner and in strict accordance with said Plans and Specifications and Bid, as accepted by Board and in accordance with the Notice of Award as follows, to wit:

(a) The Notice of Award dated the _____ day of _____201_, a copy of which is annexed hereto and made part of this agreement as fully as if herein at length.

(b) The specifications dated the_____ day of _____ 201_ are hereto annexed and made a part of this agreement as fully as if written herein at length and are marked for identification "Specifications MISSISSIPPI RIVER INTERMODAL TERMINAL, ELECTRIC RUBBER TIRE GANTRY CRANE PROCUREMENT."

(c) The Plans issued with said Specifications are hereto annexed and made part of this agreement and are initialed by the parties hereto for identification.

(d) The Bid of Contractor dated the ____ day of _____ and Addendum No. dated_____ 201_, and Addendum No. _____ dated_____ , 201_, is hereto annexed and made a part of this agreement.

Contractor hereby agrees to commence work under this Agreement on the date or dates as set forth in the aforesaid Notice of Award, and to complete all work under this agreement on or before the dates as therein set forth, subject to the assessment of ascertained and liquidated damages as set forth in the Bid of Contractor. Contractor agrees that ascertained and liquidated damages shall automatically apply against Contractor without the necessity or formality of putting Contractor in default therefore, and Contractor, further agrees that Board shall have the right to retain from any monies due Contractor, or which may become due, an amount sufficient to pay such ascertained and liquidated damages.

That for and in consideration of the faithful performance by Contractor of all singular the obligations herein assumed by, or imposed upon, Contractor by this Agreement, Board shall make payment to contractor, in the manner and at the time or times set forth in the Specifications and in accordance with Contractor's Bid, but nothing herein shall prevent Board, if it sees fit, from making payments to Contractor, without the consent of surety, in amounts or at different times than fixed herein.

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INVITATION TO BID

MISSISSIPPI RIVER INTERMODAL TERMINAL IMPROVEMENTS
ELECTRIC RUBBER TIRE GANTRY CRANE PROCUREMENT

Board of Commissioners of the Port of New Orleans will receive sealed bids in the Purchasing Department, 2nd floor, room 240, 1350 Port of New Orleans Place, New Orleans, Louisiana 70130 on December 02, 2014 until 2:00 P.M., local time, for Requisition No. 071952.

The work consists of furnishing all labor, material and equipment for the manufacturing, delivery, assembly, testing and training for two electric rubber tire gantry cranes as per the Drawings and Specifications provided in this bid document. The site for delivery is located on Mississippi River Intermodal Yard at the Napoleon Avenue Terminal Complex near 4100 Terminal Drive, New Orleans, LA 70115 at Mississippi River Mile 99.0 Ahead of Passes. (Estimated Cost: $3.0 to $4.0 million).

All Bids must be in accordance with the Contract Documents on file with the Port of New Orleans.

Complete Contract Documents may be obtained at Contract Administration on the 2nd floor, Room 203, at the above address on a payment of a non-refundable fee of $40 per set by check or money order only to the Board of Commissioners of the Port of New Orleans. In accordance with LSA R.S. 38:2212 (A) (1) (e), contract documents may also be accessed at our Port Plan Room, Port of New Orleans Web Site at http://portno.com/active-construction-projects.com.

If request for Contract Documents is made through U.S. mail or other delivery services, bidder must furnish a street mailing address and will be held responsible for service fees.

A pre-bid conference will be held on November 13, 2014 at 10:00 a.m. local time at the auditorium on the 1st floor of 1350 Port of New Orleans Place. A site visit will occur after the conference. Attendees will be bussed to the site. **Bidders are urged to attend. Bidders are requested to RSVP for the pre-bid conference before November 13, 2014 by calling 504-528-3321.** The intermodal yard construction has not commenced; therefore, the site visit would mainly provide the Contractor with the general location within the Port and potential route for transporting the Cranes from the wharf to the yard, if required. TWIC is not required to attend the pre-bid meeting.

Federal regulations require that persons seeking entry to secure areas of United States ports must present a valid Transportation Workers Identification Credential (TWIC) card and must maintain possession of the TWIC at all times in secure port areas.

Persons seeking entry to the below listed facilities of the Port of New Orleans must possess a TWIC in order to attend pre-bid meetings on port property. Restricted areas include port property between Felicity Street and Henry Clay Avenue, Alabo Street Wharf, Jourdan Road Wharf, the Julia Street and Erato Street Cruise Terminals, and during cargo activities at Poland Avenue Wharf and Governor Nicholls Street Wharf. Prospective bidders must provide their own Harbor Police Department (HPD) approved TWIC escorts for those in their party who do not have TWIC's. Note that only

contractors with open Port of New Orleans contracts are eligible to be on the approved escort list. The port will not provide nor arrange for escorts. See Section 1000 – General Requirements.

Once an employer is under contract with the Board, TWIC card holders and their Sponsoring Employer must submit an application to Harbor Police and the TWIC card holder must attend a training session in order to be certified as an Approved TWIC Escort for anyone entering the secured area without a TWIC.

Contractor shall perform at job site, in his own shop or in his own plant or yard, and with his own organization, all design and management supervision of all work to be performed under the Contract.

The Board as an equal opportunity public entity invites and encourages minority-owned and disadvantaged business companies to submit bids on its projects.

Hard copies of the contract documents are available for purchase. Electronic copies of the contract documents are available to prospective bidders via our Port Plan Room on the Port of New Orleans' web site at www.portno.com. Contract documents may also be available via e-mail to prospective bidders.

For general information or for questions related to bidding, please contact:

Mr. Terry Martin, Purchasing Agent
Phone: (504) 528-3345
E-mail: martint@portno.com

Technical questions should be addressed to the following:

Mr. Bryan Burger, P.E., Container Crane Department Manager
Port of New Orleans
Phone: (504) 528-3415
E-mail: burgerb@portno.com

and

Mr. Brad P. Navarre, P.E., Port's Consulting Engineer
Boos Navarre, LLC
Phone: (251) 459-0862
E-mail: bnavarre@boosnavarre.com

These individuals are not authorized to and shall not render legal opinions or advice. No information will be given regarding the proper evidence of corporate authority as required in this bid. Each bidder is advised to consult his own counsel for such information.

Please be advised that these individuals are not the legal representatives of the Board.

INSTRUCTIONS TO BIDDERS

GENERAL. The Port of New Orleans accepts bids via one of two methods – either electronically or via hard copy in compliance with LSA R.S. 38:2212 et seq. When an electronic bid is submitted, the contractor shall follow policies and procedures of the service authorized to transmit electronic bids on the Port's behalf. When a hard copy bid is submitted, the following policies and procedures apply unless otherwise explicitly stated:

BID FORM. The bid shall be submitted only on the LOUISIANA UNIFORM PUBLIC WORK BID FORM provided, and if required with the accompanying UNIT PRICE FORM, if unit prices are incorporated in the base bid, fully filled in, with no blanks, deletions, alterations, or qualifications, and shall be signed by a duly authorized officer of firm submitting bid.

SUBMITTAL OF BID. For bids submitted as hard copy, the bid, sealed in an envelope, shall be delivered to the office of the Board's Purchasing Department, 2nd floor, room 240, 1350 Port of New Orleans Place, New Orleans, Louisiana, or mailed to address P.O. Box 60046, Zip 70160. The submittal must be made prior to the time stipulated in the project advertisement for receipt of sealed bids. For bids submitted electronically, bid related materials may be found online and electronic bids may be submitted online at www.CENTRALBIDDING.com. The Board shall not be responsible if a bidder cannot complete and submit an electronic bid because of failure or incomplete delivery of the files submitted via the internet. Bidders shall be responsible for receiving confirmation that the bid was successfully delivered prior to the deadline stated in the Bidding Documents.

Bidders' attention is also directed to LSA R.S. 38:2212(A) et seq which provides that all bids for either labor and materials or for materials alone, which are required by law to be duly advertised, shall be hand-delivered to the awarding authority with a written receipt given to the deliverer, sent by registered or certified mail with a return receipt requested, or submitted electronically to the website indicated above.

DEPOSIT WITH BID. Each bid shall be accompanied by the deposit of a certified check, a cashier's check, or a bid bond of a corporate surety authorized to do business in the State of Louisiana, for an amount of 5% of the cost of the contract price of work to be done for the Base Bid, payable to the Board of Commissioners of the Port of New Orleans as a guarantee that the bidder will, if awarded the contract, enter into the notarial contract described below. If a bid bond is furnished, it must be accompanied by a Power of Attorney of the surety company. Requirements governing current rating of the surety company furnishing the bid bond shall be in accordance with the requirements of LSA R. S. 38:2218. Deposits or bid bonds will be returned to the unsuccessful bidders soon after the award of the contract, and to the successful bidder when he has signed the contract and has furnished the required performance bond. If the successful bidder fails to furnish the performance bond as required, his deposit will be forfeited to the Board as stipulated damages, and/or a claim shall be made against the surety on the bid bond.

WITHDRAWAL OR REVISION OF BID. A Bidder may withdraw or revise a proposal after it has been deposited with the Board, provided the request for such withdrawal or revision is received by the Board prior to the time for opening of bids.

Revised bid must be submitted to Board prior to time set for public opening of bids.

Bids with patently obvious, unintentional, and/or substantial mechanical, clerical, or mathematical errors, or errors of unintentional omission of a substantial quantity of work, labor, material, or services made directly in the compilation of the bid, may be withdrawn by a bidder if clear and convincing sworn, written evidence of such errors is furnished to the Board within forty-eight hours of the bid opening excluding Saturdays, Sundays, and legal holidays. Such errors must be clearly shown by objective evidence drawn from inspection of the original work papers, documents, or materials used in the preparation of the bid sought to be withdrawn. Otherwise, the bidder shall forfeit the bid bond or bid deposit.

A bidder who attempts to withdraw a bid under the provisions stated above shall not be allowed to resubmit a bid on the project. If the bid withdrawn is the lowest bid, the next lowest bid may be accepted.

EXAMINATION OF CONTRACT DOCUMENTS AND SITE OF WORK. The Board prepares and makes available to prospective bidders a complete set of contract documents which will enable any competent Contractor to properly execute all work required on the project.

PRE-BID CONFERENCE. A pre-bid conference will be held on November 13, 2014 at 10:00 a.m. local time at the auditorium on the 1st floor of 1350 Port of New Orleans Place. A site visit will occur after the conference. Attendees will be bussed to the site. **Bidders are urged to attend. Bidders are requested to RSVP for the pre-bid conference before November 12, 2014 by calling 504-528-3321.** The intermodal yard construction has not commenced; therefore, the site visit would mainly provide the Contractor with the general location within the Port and potential route for transporting the Cranes from the wharf to the yard, if required. TWIC is not required to attend the pre-bid meeting.

Federal regulations require that persons seeking entry to secure areas of United States ports must present a valid Transportation Workers Identification Credential (TWIC) card and must maintain possession of the TWIC at all times in secure port areas.

Persons seeking entry to the below listed facilities of the Port of New Orleans must possess a TWIC in order to attend pre-bid meetings on port property. Restricted areas include port property between Felicity Street and Henry Clay Avenue, Alabo Street Wharf, Jourdan Road Wharf, the Julia Street and Erato Street Cruise Terminals, and during cargo activities at Poland Avenue Wharf and Governor Nicholls Street Wharf. Prospective bidders must provide their own Harbor Police Department (HPD) approved TWIC escorts for those in their party who do not have TWIC's. Note that only contractors with open PONO contracts are eligible to be on the approved escort list. The port will not provide nor arrange for escorts. See Section 1000 – General Requirements.

Prior to submitting a proposal, bidders are expected to examine carefully these contract documents in their entirety, including order of work, phasing, and potential impact to operations of the Board and others at the site, and conditions existing and/or likely to exist during the time of the work, and their possible effect on receipt and storage of materials, difficulties in performing the work, and rate of progress.

INFORMALITIES. The Total Base Bid must be submitted on the LOUISIANA UNIFORM PUBLIC WORK BID FORM furnished, completely filled in, and signed by a duly authorized officer of firm submitting bid. The LOUISIANA UNIFORM PUBLIC WORK BID FORM and the accompanying UNIT PRICE FORM if used must be completely filled in without any removal, modification, or deletion. Failure to comply with these requirements or the introduction of other informalities, such as alteration of specified time schedule or completion dates, may be considered cause for rejection of bid. Failure to sign the bid as hereinabove provided or failure to submit required bid security, including power of attorney, with bid bond, will also constitute cause for rejection of bid.

SUBMITTAL OF PERFORMANCE BOND, AFFIDAVIT OF NON-COLLUSION, ATTESTATION CLAUSE, AFFIDAVIT OF USE OF STATUS VERIFICATION SYSTEM AND PROOF OF INSURANCE WITHIN TEN CALENDAR DAYS AFTER BID OPENING. In accordance with ACT No. 281, effective August 15, 2011, R.S. 38:2212 (A)(I)(b)(ii)(aa) and (bb) and (3)(c)(ii) was amended such that the low bidder shall submit to the Board originals of the performance bond, affidavits of non-collusion, attestation clause, affidavit of use of status verification system and proof of insurance by close of business (4:45 p.m. Monday thru Friday), within 10 calendar days after the bid opening. Submission should be delivered to the Port of New Orleans Administration Building, 1350 Port of New Orleans Place, New Orleans, La 70130, Room 240 - Purchasing Department. Failure to comply by the deadline will cause the bid to be deemed non-responsive.

AFFIDAVIT OF NON COLLUSION, ATTESTATION CLAUSE AND AFFIDAVIT OF USE OF STATUS VERIFICATION SYSTEM. Pursuant to the provisions of LSA R.S. 38:2224, the successful bidder will be required to execute an affidavit attesting that the public contract was not and will not be secured through employment or payment of any solicitor. In addition, the apparent low bidder shall be required to attest by written affidavit that he/she has not been convicted or has not entered a plea of guilty or nolo contendere to any of the state crimes or equivalent federal crimes listed in LSA RS 38:3227. If applicable, the apparent low bidder shall attest by written affidavit that no partner, officer, director, or similar official, who owns at least 10% ownership in the corporation submitting the bid has been convicted or has entered a plea of guilty or nolo contendere to any of the state crimes or equivalent federal crimes listed in LSA RS 38:3227.

RECENT CHANGES TO LOUISIANA'S PUBLIC CONTRACTS LAW (ACT NO. 281 OF 2011) NOW REQUIRE THAT CERTAIN DOCUMENTS "SHALL BE FURNISHED BY THE LOW BIDDER WITHIN TEN DAYS AFTER THE BID OPENING."

BIDDERS MUST THEREFORE BE PREPARED TO PROVIDE TO THE BOARD'S CONTRACT ADMINISTRATOR WITHIN TEN DAYS AFTER THE BID OPENING CERTAIN DOCUMENTS, INCLUDING FOR EVERY CONTRACT THE AFFIDAVIT OF NON-COLLUSION (THEIR ETHICS AFFIDAVIT), THE ATTESTATION CLAUSE (REGARDING PAST CRIMINAL CONVICTIONS OF BIDDERS) AND WRITTEN PROOF OF THE ABILITY TO OBTAIN ALL REQUIRED INSURANCE AS SET OUT IN THE SPECIFICATIONS AND THE PERFORMANCE BOND. ANY OTHER DOCUMENTS REQUIRED FOR A SPECIFIC TYPE OF CONTRACT MUST BE PROVIDED WITHIN THIS 10-DAY TIME FRAME. FAILURE TO COMPLY WITH THIS DEADLINE WILL CAUSE THE BID TO BE DEEMED NON-RESPONSIVE.

There is no change in the procedure with regard to those documents required by the bid documents to be provided at the time of the bid opening.

Submissions must be delivered to the Port of New Orleans Administration Building, 1350 Port of New Orleans Place, New Orleans, LA 70130. Room 240 - Purchasing Department, between the hours of 8:30 AM and 4:45 PM Monday through Friday.

ADDITIONAL INFORMATION. The bidder's attention is directed to the information and requirements set forth in SPECIAL CONDITIONS - ARTICLE 4 of the specifications wherein a general description of the work, the project site, conditions under which work is to be performed, and which are expected to exist during the contract period are set forth. If, after studying the plans and specifications and visiting the site, more detailed information is needed it may be obtained by inquiry from the Board's Engineering Dept., 1350 Port of New Orleans Place, New Orleans, LA., P.O. Box 60046, Zip 70160, phone (504) 528-3300.

Please be advised that with reference to GENERAL CONDITIONS - ARTICLE 17 of the General Conditions, in those instances when it is deemed necessary to provide uniformed, armed, fully commissioned police officers to provide security or traffic control at the work site in the port area, the members of this Board's Harbor Police Department have full police powers applicable in the parishes of Orleans, Jefferson and St. Bernard, pursuant to commissions issued by this Board (LRS 34:26), and are legally permitted, when not on Port duty, to take outside assignments.

JOINT VENTURE CONTRACTS. In the event that a joint venture bid is submitted and accepted, the contract shall be executed by authorized representatives of all parties of the joint venture. One of the parties of the joint venture shall be designated and authorized to represent all parties in said joint venture in the coordination and scheduling of the work, and receipt of notices for work to be performed, together with all other correspondence. However, it shall be specifically understood that such representation will in no manner relieve the other parties to the joint venture of the responsibilities under all of the terms and conditions of the contract.

The bid shall be signed by all parties of the joint venture, together with "Title in Firm" of each.

All payments and billings under the contract will be in the name of the joint venture.

PRICES BID. The Board of Commissioners Port of New Orleans utilizes the State of Louisiana's LOUISIANA UNIFORM PUBLIC WORK BID FORM as required by law. On this form, as provided, the amount shown as the TOTAL BASE BID is the lump sum amount for any and all work required by the Bidding Documents (including any and all unit prices designated to be part of the TOTAL BASE BID in the Bidding Documents). The UNIT PRICE FORM, accompanying the LOUISIANA UNIFORM PUBLIC WORK BID FORM, shall be used for any and all work required by the Bidding Documents and described in the "Measurement and Payment" sections as an estimated quantity to be field measured to determine actual quantities used. The Contractor's payment will be based upon these quantities verified by the Board at the unit prices stated in the UNIT PRICE FORM. Refer to SPECIAL CONDITIONS - ARTICLE 7 for a description of those

items.

DO NOT SUM THE UNIT PRICES SHOWN ON THE UNIT PRICE FORM, SINCE THE TOTAL BASE BID SHOWN ON THE LOUISIANA UNIFORM PUBLIC WORK BID FORM WILL ALREADY INCLUDE THESE AMOUNTS.

Payment to the successful Bidder for work listed on the UNIT PRICE FORM will be made only for the actual quantities of work performed and accepted by Board in accordance with the contract. The estimated quantity may be increased, decreased or deleted after award of contract in accordance with the provisions of the contract documents.

Prices bid shall be complete, so as to cover every cost expense, tax or charge incurred by the Contractor in performance of the contract, including but not limited to any and all sales and use taxes payable by Contractor and which might otherwise be charged against the Board. (SPECIAL CONDITIONS - ARTICLE 1)

Contractor's bid price shall include provisions for Contractor retaining possession of all materials and equipment not specified to be salvaged for the Board and such materials and equipment shall become the property of the Contractor for his use, salvage, disposal or sale. All removals and disposals of regulated materials and/or materials containing regulated substances must be in accordance with all local, state and federal environmental and worker safety (OSHA) regulations.

AWARD OF CONTRACT

The Board will award the contract to the lowest responsive bidder who has bid the lowest amount shown as the TOTAL BASE BID on the LOUISIANA UNIFORM PUBLIC WORK BID FORM in accordance with the Bidding Documents as advertised, including any and all addenda. The right is reserved to award the contract as hereinabove provided or to reject all bids for just cause as provided by law and advertise for new proposals. Whenever one or more alternate bids are shown on the LOUISIANA UNIFORM PUBLIC WORK BID FORM, alternates, if accepted, shall be accepted in the order in which they are listed on the UNIFORM PUBLIC WORK BID FORM. Determination of the low bidder shall be made on the basis of the sum of the Total Base Bid and the additive or deductive alternate or alternates accepted by the Board. The Board reserves the right to accept alternates in any order, provided that in doing so, it does not affect the determination of the low bidder.

The award of contract, if awarded, will be made to the lowest qualified bidder whose bid complies with all requirements prescribed within 45 calendar days after opening proposals. However, when the contract is to be financed by bonds which are required to be sold after receipt of bids, or when the contract is to be financed in whole or in part by federal, state or other funds not available at the time bids are received, the time will not start until receipt of federal or state concurrence or concurrence of the other funding source. Award will be within 45 calendar days after the sale of bonds or receipt of concurrence in award from the federal or state agency or other funding source. The successful bidder will be notified by letter mailed to the address shown on the Bid Form that the bidder is awarded the contract.

The award of contract for projects financed either partially or entirely with State

bonds will be contingent on approval by the State Bond Commission.

On projects involving federal or state funds the award of contract will also be contingent upon concurrence by the appropriate federal or state agency.

The Board reserves the right to cancel the award of contract at any time before execution of said contract by all parties without liability against the Board.

PREFERENCE IN LETTING CONTRACTS. Louisiana resident contractors shall be granted preference over contractors domiciled in another state in accordance with the provisions and requirements of LSA R.S. 38:2225.

MINORITY AND WOMEN BUSINESS ENTERPRISES. The Board adheres to the bid laws and procurement regulations of the State of Louisiana. The Board strongly encourages maximum participation in all bids by qualified Minority Business Enterprises. (Refer to ARTICLE 46 of the GENERAL CONDITIONS)

LOUISIANA UNIFORM PUBLIC WORK BID FORM

TO: Board of Commissioners Port of New Orleans
1350 Port of New Orleans Place
P.O. Box 60046
New Orleans, LA 70160

BID FOR: Mississippi River Intermodal Terminal Electric Rubber Tire Gantry Crane Procurement

Requisition Number 071952 W. O. 1-109

The undersigned bidder hereby declares and represents that she/he; a) has carefully examined and understands the Bidding Documents, b) has not received, relied on, or based his bid on any verbal instructions contrary to the Bidding Documents or any addenda, c) has personally inspected and is familiar with the project site, and hereby proposes to provide all labor, materials, tools, appliances and facilities as required to perform, in a workmanlike manner, all work and services for the construction and completion of the referenced project, all in strict accordance with the Bidding Documents prepared by: AECOM Technical Services, Inc. and dated 22 October 2014.

Bidders must acknowledge all addenda. The Bidder acknowledges receipt of the following **ADDENDA:** (Enter the number the Designer has assigned to each of the addenda that the Bidder is acknowledging) _____ .

TOTAL BASE BID: For all work required by the Bidding Documents (including any and all unit prices designated "Base Bid" * but not alternates) the sum of:

_____ Dollars ($ _____)

ALTERNATES: For any and all work required by the Bidding Documents for Alternates, including any and all unit prices designated as alternates in the unit price description.

Alternate No. 1 Supply of alternate spreaders per Specification Section 5.4. Add the lump sum of:

_____ Dollars ($ _____)

Alternate No. 2 Supply containers for spare parts and tools per Specification Sections 14.8 and 29.4. Add the lump sum of:

_____ Dollars ($ _____)

Alternate No. 3 (Describe the alternate) (Add) (Deduct) the lump sum of:

N/A Dollars ($ N/A)

NAME OF BIDDER: _____

ADDRESS OF BIDDER: _____

_____

NAME OF AUTHORIZED SIGNATORY OF BIDDER: _____

TITLE OF AUTHORIZED SIGNATORY OF BIDDER: _____

SIGNATURE OF AUTHORIZED SIGNATORY OF BIDDER **: _____

DATE: _____

* The Unit Price Form shall be used if the contract includes unit prices. Otherwise it is not required and need not be included with the form. The number of unit prices that may be included is not limited and additional sheets may be included if needed.

** If someone other than a corporate officer signs for the Bidder/Contractor, a copy of a corporate resolution or other signature authorization shall be required for submission of bid. Failure to include a copy of the appropriate signature authorization, if required, may result in the rejection of the bid unless bidder has complied with La. R.S. 38:2212(A)(1)(c) or RS 38:2212(O) .

BID SECURITY in the form of a bid bond, certified check or cashier's check as prescribed by LA RS 38:2218.A is attached to and made a part of this bid.

BID BOND

BID FOR: Mississippi River Intermodal Terminal Improvements
Electric Rubber Tire Gantry Crane Procurement

Requisition Number 071952 Work Order 1-109

Date: _____

KNOW ALL MEN BY THESE PRESENTS:

That_____of_____, as Principal, and_____, as Surety, are held and firmly bound unto the _____ (Obligee), in the full and just sum of five (5%) percent of the cost of the contract price of work to be done for the Base Bid price, lawful money of the United States, for payment of which sum, well and truly be made, we bind ourselves, our heirs, executors, administrators, successors and assigns, jointly and severally firmly by these presents.

Surety represents that it is listed on the current U. S. Department of the Treasury Financial Management Service list of approved bonding companies as approved for an amount equal to or greater that the amount for which it obligates itself in this instrument or that it is a Louisiana domiciled insurance company with at least an A - rating in the latest printing of the A. M. Best's Key Rating Guide. If surety qualifies by virtue of its Best's listing, the Bond amount may not exceed ten percent of policyholders' surplus as shown in the latest A. M. Best's Key Rating Guide.

Surety further represents that it is licensed to do business in the State of Louisiana and that this Bond is signed by surety's agent or attorney-in-fact. This Bid Bond is accompanied by appropriate power of attorney.

THE CONDITION OF THIS OBLIGATION IS SUCH that, whereas said Principal is herewith submitting its proposal to the Obligee on a Contract for:

_____

NOW, THEREFORE, if the said Contract be awarded to the Principal and the Principal shall, within such time as may be specified, enter into the Contract in writing and give a good and sufficient bond to secure the performance of the terms and conditions of the Contract with surety acceptable to the Obligee, then this obligation shall be void; otherwise this obligation shall become due and payable.

_____ _____

PRINCIPAL (BIDDER) SURETY

BY: _____ BY:_____

AUTHORIZED OFFICER-OWNER-PARTNER AGENT OR ATTORNEY-IN-FACT(SEAL)

ATTESTATION CLAUSE REQUIRED BY
LA. R.S. 38:2227 (PAST CRIMINAL CONVICTIONS OF BIDDERS)

Sworn statements shall be submitted in the form of an affidavit as indicated below, executed and sworn to by the bidder before persons authorized by laws of the State to administer oaths. The original of such sworn statement shall be submitted by the successful bidder before the Award of Contract. The award of Contract shall be within (__) calendar days of the bid opening.

State Project Number: _____ (if applicable)

Name of Project: __Mississippi River Intermodal Yard Improvements Electric Rubber Tire Gantry Crane Procurement__

Parish: Orleans

(an individual)
(a partnership)
_____ (a corporation)

certify that:

Appearer, as a Bidder on the above-entitled Public Works Project, does hereby attest that:

A. No sole proprietor or individual partner, incorporator, director, manager, officer, organizer, or member who has a minimum of a ten percent (10%) ownership in the bidding entity named below has been convicted of, or has entered a plea of guilty or nolo contendere to, any of the following state crimes or equivalent federal crimes:

(a) Public bribery (R.S. 14:118)
(b) Corrupt influencing (R.S. 14:120)
(c) Extortion (R.S. 14:66)
(d) Money laundering (R.S. 14:23)

B. Within the past five years from the project bid date, no sole proprietor or individual partner, incorporator, director, manager, officer, organizer, or member who has a minimum of a ten percent (10%) ownership in the bidding entity named below has been convicted of, or has entered a plea of guilty or nolo contendere to any of the following state crimes or equivalent federal crimes, during the solicitation or execution of a contract or bid awarded pursuant to the provisions of Chapter 10 of Title 38 of the Louisiana Revised Statutes:

(a) Theft (R.S. 14:67)
(b) Identity Theft (R.S. 14:67.20)
(c) Theft of a business record (R.S. 14:67.20)
(d) False accounting (R.S. 14:70)
(e) Issuing worthless checks (R.S. 14:71)
(f) Bank fraud (R.S. 14:71.1)
(g) Forgery (R.S. 14:72)
(h) Contractors; misapplication of payments (R.S. 14:202)
(i) Malfeasance in office (R.S. 14:134)

_____ _____
Name of Bidder | Name of Authorized Signatory of Bidder

_____ _____
Date | Title of Authorized Signatory of Bidder

WITNESSES:

_____ _____
Signature of Authorized Signatory Bidder

_____

Parish or county _____

State of _____

Subscribed and sworn to before me this _____ day of _____, 20___.

_____ _____
NOTARY PUBLIC (signature) NOTARY PUBLIC (printed name)

_____ _____
NOTARY PUBLIC NUMBER EXPIRATION DATE

NON COLLUSION DECLARATION

A sworn statement shall be submitted in the form of an affidavit as indicated below, executed and sworn to by the bidder before persons authorized by laws of the State to administer oaths. The original of such sworn statement shall be submitted by the successful bidder after the Award of Contract.

Affidavit

State Project Number: _____ (if applicable)

Name of Project: Mississippi River Intermodal Yard Improvements Electric Rubber Tire Gantry Crane Procurement

Parish: Orleans

(an individual)
(a partnership)
_____ (a corporation)

certify that:

(1) That affiant employed no person, corporation, firm, association, or other organization, either directly or indirectly, to secure the public contract under which he received payment, other than persons regularly employed by the affiant whose services in connection with the construction, alteration or demolition of the public building or project or in securing the public contract were in the regular course of their duties for affiant, and

(2) That no part of the contract price received by affiant was paid or will be paid to any person, corporation, firm, association, or other organization for soliciting the contract, other than the payment of their normal compensation to persons regularly employed by the affiant whose services in connection with the construction, alteration or demolition of the public building or project were in the regular course of their duties for affiant.

(an individual)
(a partnership)
(a corporation)

WITNESSES: Signed _____

_____ By _____

_____ Title _____

Parish or county _____

State of _____

Subscribed and sworn to before me this _____ day of_____, 20___.

_____
NOTARY PUBLIC (signature)

_____
NOTARY PUBLIC (printed name)

_____ _____
NOTARY PUBLIC NUMBER EXPIRATION DATE

AFFIDAVIT OF USE OF STATUS VERIFICATION SYSTEM

PURSUANT TO La. R.S. 38:2212.10C, a private employer shall not bid on or otherwise contract with a public entity for the physical performance of services within the state of Louisiana unless the private employer verifies in a sworn affidavit that the private employer is registered with, participates in, and utilizes the status verification system required by La. R.S. 38:2212.10B(2), known as the "E-Verify" program, in accordance with federal rules and regulations pertaining to E-Verify.

Name of Private Employer: _____

Name of Authorized Agent: _____

Mailing Address: _____

_____

ATTESTATION

I hereby attest that _____:
(name of private employer)

1. Is registered with and participates in the status verification system to verify that all new employees in the state of Louisiana are legal citizens of the United States or are legal aliens.

2. Will continue, during the term of the contract, to utilize the status verification system to verify the legal status of all new employees in the state of Louisiana.

3. Will require all subcontractors to submit an affidavit verifying that the subcontractor is registered with, participates in, and utilizes the status verification system to verify the legal status of all new employees in the State of Louisiana.

CERTIFICATE OF ACCURACY

I hereby certify that the information herein is true and correct to the best of my knowledge, information, and belief.

_____
Signature (Authorized Agent)

Sworn To And Subscribed, before me, this ____ day of _____, 20____, in _____, Louisiana.

_____
Notary Public

GENERAL CONDITIONS

ARTICLE 1 - DEFINITIONS

(a) The Contract Documents consist of the Agreement, Table of Contents, Invitation to Bid, Instructions to Bidders, the Bid, the General Conditions of the Contract, and Special Conditions if any, the Letter of Award or Notice to Proceed, the “Specifications”, Addenda if any, the Bond, and the Plans if any, including all modifications thereof incorporated into the documents before their execution, also all change orders and agreements that are required to complete the construction of the work in an acceptable manner, including all authorized extensions thereof. These form the contract.

(b) “Board” and “Contractor” are those mentioned as such in the agreement. Board may sometimes be referred to as “Port”.

(c) Wherever in this contract the word "Engineer" is used, it shall be understood as referring to the Owner acting personally or through the Manager of Construction Service of Board, an assistant to said, consulting engineer or architect duly authorized for such act by Engineer.

(d) Any and all notices to be given by Board to Contractor under this contract shall be deemed to be served if the same be delivered to the person in charge of any office used by Contractor or to his superintendent, or, in their absence, to a foreman at or near the work, or deposited in the post office, postpaid, addressed to Contractor at his last known place of business.

(e) The term "subcontractor" as employed herein, includes only those having a direct contract with Contractor, and it includes one who furnishes material worked to a special design according to the plans and specifications of this work, but does not include one who merely furnishes material not so worked.

(f) The term "work" of Contractor or subcontractor includes labor or materials or both, equipment, transportation and other facilities, necessary to complete the contract.

(g) The words "plans" and "drawings" are used synonymously in this contract.

(h) Wherever the singular masculine pronoun is used herein, as referring to Contractor, it shall be construed to mean all genders, singular and plural, according to the status of Contractor.

(i) The term “site” as employed herein can refer to either the Fabrication Site or Erection Site or both as the context implies or as interpreted by the Engineer. The following definitions also apply:

Fabrication Site – Refers to the Contractor’s main facility where the

manufacture, assembly, erection, and testing will be performed prior to shipping the Cranes to the Erection Site.

Erection Site - Refers to the location of the Cranes within the Mississippi River Intermodal Terminal where all Crane work will be performed by the Contractor, including the RTG Erection Area, RTG Testing Area, terminal entrance & access, electrical and utility hookups, etc.

RTG Erection Area – As called out on the Drawings.

RTG Testing Area – As called out on the Drawings.

(j) The Bidding Documents include the advertisement, Invitation to Bidders, Instructions to Bidders, Louisiana Uniform Public Work Bid Form, Unit Price Forms, Bid Bond Form, General Conditions, Form of Agreement, drawings, specifications, addenda, special provisions, and all other written instruments prepared by or on behalf of the Board for use by prospective bidders on a public contract."

ARTICLE 2 - INTENT OF DOCUMENTS

The contract documents are complementary, and what is called for by one shall be as binding as if called for by all. The intention of the documents is to include all labor and materials, equipment, transportation and other facilities, necessary for the proper execution of the work. It is not intended, however, that materials or work not covered by or properly inferable from any heading, branch, class or trade of the specifications shall be supplied unless distinctly so noted on the drawings. Materials or work described in words which so applied have a well-known technical or trade meaning, shall be held to refer to such recognized standards.

ARTICLE 2A - ORDER OF PRECEDENCE

Anything mentioned in the Specifications and not shown on the Contract Drawings, or shown on the Contract Drawings and not mentioned in the Specifications, shall be of the like effect as if shown or mentioned in both. In case of conflict between Contract Drawings and Specifications, the Contract Drawings shall govern and in any differences in the said Specifications between the General Conditions and the Special Conditions, the Special Conditions shall govern. The Contractor shall abide by the rules and statements set forth in the General Conditions and Special Conditions of these Specifications.

ARTICLE 3 - DRAWINGS, SPECIFICATIONS AND INSTRUCTIONS

Unless otherwise provided in the contract documents, Board will furnish to Contractor, free of charge, copies of drawings and specifications for the execution of the work, up to a total of ten (10) sets. If Contractor obtains additional copies of drawings and specifications, he will be charged, at cost, for all copies in excess of ten (10) each.

Contractor shall keep at job site one copy of all drawings and specifications on the work, in good order, available to Engineer and to his representatives.

Engineer shall furnish, with reasonable promptness, additional instructions, by means of drawings or otherwise, necessary for the proper execution of the work. All such drawings and instructions shall be consistent with the contract documents, true developments thereof, and reasonably inferable therefrom.

If Contractor, in the course of the work, finds any condition different from that designated in the specifications or on the plans, either in regard to work previously existing or being performed by others, or finds any discrepancy between plans and physical conditions of the locality, or errors or omissions on plans, or in the layout as given by points and instructions, it shall be his duty to immediately inform Engineer and confirm in writing, and Engineer will promptly correct or verify same. After observing any such discrepancy, Contractor shall not proceed with any part of the work which involves the discrepancy, and he shall neither start nor resume work thereon until the condition has been corrected or until authorized to proceed by Engineer. Any work by the Contractor without such correction or authorization, shall be at its own risk and expense.

ARTICLE 4 – TIME LIMITS AND ORDER OF BEGINNING AND COMPLETION

Contractor shall begin and complete the work or specified portions of the work in such order of time as stated in SPECIAL CONDITIONS - ARTICLE 3.

Immediately after the award of contract, Contractor shall set aside or order all necessary materials. He shall ready his equipment and forces and shall handle preliminary details at once, and other details promptly as needed, so as to begin work at the site when specified, as ordered in written notice from Engineer to do so; and he shall proceed with the work to completion according to detailed requirements of these contract documents, within the time stated in SPECIAL CONDITIONS - ARTICLE 3 and as further covered by SPECIAL CONDITIONS - ARTICLE 4.

ARTICLE 5 – ASCERTAINED AND LIQUIDATED DAMAGES

After expiration of the time or times for completion of the work, or separate phases of the work, according to the contract, including all authorized extensions, and without the necessity or formality of putting Contractor in default therefore, there shall be assessed ascertained and liquidated damages, in the amount stated in SPECIAL CONDITIONS - ARTICLE 3 for each calendar day of delay in completing said work, or phases of the work, substantially and satisfactorily in accordance with the plans and specifications.

ARTICLE 6 - BONUSES FOR EARLY COMPLETION

When stated in the bid and then only, Board will pay a bonus or bonuses to Contractor for completion of all work prior to the time or times stated in the contract, including all authorized extensions. The bonus or bonuses in the amount or amounts stated in the bid will be paid for each calendar day of early

completion of all work when a single bonus applies, or (where the work is phased) of completion of the respective phases of the work when more than one payment applies.

ARTICLE 7 - NIGHT, WEEKEND AND HOLIDAY WORK

No work shall be allowed to be performed at night, weekends, or on a legal holiday, without due notification, in advance, by Contractor to Engineer.

ARTICLE 8 - DELAYS AND EXTENSION OF TIME

If Contractor be delayed at any time in the progress of the work by any act or neglect of Board or of its employees, or by any other contractor employed by Board, or by changes ordered in the work, or by strikes, lockouts, fire, unusual delay in transportation, unavoidable casualties, or any causes beyond Contractor's control, or by any cause which Engineer shall decide justifies the delay, then the time of completion shall be extended for such reasonable time as Engineer may decide.

No such extension shall be made for delay occurring more than seven (7) days before claim is made in writing to Engineer. In the case of a continuing cause of delay, only one claim is necessary.

If no schedule or agreement stating the dates upon which drawings shall be furnished is made, then no claim for delay shall be allowed on account of failure to furnish drawings, until two (2) weeks after demand for such drawings, and not then unless such claims be reasonable in the opinion of Engineer.

This Article does not exclude the recovery of damages for delay by either party under other provisions in the contract documents.

ARTICLE 9 - CONTRACTOR'S UNDERSTANDING

It is understood that Contractor has, prior to submission of bid, satisfied himself as to the nature and location of the work, the conformation of the ground, the type, quality and quantity of the materials to be encountered, the type of equipment and the facilities needed prior to and during the prosecution of the work, the general and local conditions, and all other matters which might in any way affect the work under this contract. No verbal agreement or conversation with any officer, agent or employee of Board, before, during, or after the execution of this contract, shall affect or modify the terms or obligations herein contained.

ARTICLE 10 - MATERIALS, EQUIPMENT, APPLIANCES AND EMPLOYEES

Unless otherwise stipulated, Contractor shall provide and pay for all materials, labor, water, tools, equipment, light, power, transportation and other facilities necessary for the execution and completion of the work.

Unless otherwise specified, all materials shall be new, and all workmanship, equipment, materials and articles incorporated into the work covered by the contract are to be of grade and quality consistent with other specified items and as indicated by evidence satisfactory to Engineer.

When specified, required by standard specification made part of Board's specifications, or requested by Engineer, Contractor shall submit certified copies of records showing course of supply, mill certificates, quality control of production and processing, or other evidence satisfactory to Engineer proving material quality. Engineer has the right, at Board's cost, to do additional checking at source of supply or manufacture, and at any time before, during or after delivery, and to reject materials whenever non-compliance or defects are found.

Contractor shall be responsible for all materials received for this construction, including materials furnished him by Board, and he shall take all necessary precautions to protect same from loss and damage.
Construction equipment shall be adequate for job and specification requirements; any alterations made in equipment shall be without added cost to Board except for authorized changes in the work.

Contractor shall, at all times, enforce strict discipline and good order among his employees, and shall not employ on the work any unfit person or anyone not qualified to perform the work assigned to him.

If any person employed on the work shall refuse or neglect to obey the directions of Contractor, or his duly authorized agents, as to workmanship, character of the work or quality of materials, or if he is so incompetent, disorderly or unfaithful as to interfere with the proper fulfillment of this contract, he shall, upon the request of Engineer, be at once discharged and not again employed on the work.

ARTICLE 11 - EQUALITY

Whenever proprietary materials, equipment, machinery or other products are specified, alternate materials, equipment, machinery or other products, of well known manufacture, equal in every respect to those specified, may be used, when approved in advance of their use, by Engineer. All substitutions shall be compatible with other items required for the work, and equality with specified items shall be as determined by Engineer, predicated upon the alternate item or items meeting all requirements embodied in those specified. Every substitution, even though approved by Engineer, shall remain the full responsibility of the Contractor who will submit the bid. All items shall be handled, applied or installed in strict accordance with manufacturer's recommendations and instructions and with these specifications.

All requests for substitutions shall be submitted in writing by Contractor, and Engineer's decision will be rendered to Contractor in writing. All requests must be accompanied by complete manufacturer’s literature, drawings if necessary, and specifications, covering the properties and use of the item or items to be substituted.

If the Contractor who will submit the bid wishes to request prior approval a particular product other than a product specified in the Contract Documents, he shall do so no later than ten (10) calendar days prior to the opening of bids. Within three days, exclusive of holidays and weekends, after receipt of said request, the Engineer shall furnish to both the Board's Engineering Department and the requesting party written approval or denial of the product submitted and the prior approved product will be listed in an addendum.

ARTICLE 12 - REMOVAL OF IMPROPER MATERIAL

If Contractor shall bring or cause to be brought on the work materials which do not conform to the requirements of the contract, Engineer shall order the same to be removed forthwith, whether or not incorporated into the work, and in case of the neglect or refusal of Contractor or those employed by him to remove such materials, Engineer shall cause the same to be removed at the expense of Contractor and shall deduct the cost of such removal and all other expenses incident thereto either from the final or from any other estimate of the amount due to Contractor on this contract.

ARTICLE 13 - ROYALTIES AND PATENTS

Unless otherwise specified, Contractor shall pay all royalties and license fees. He shall defend, at his own cost and risk, all suits or claims for infringement of any and all patent rights and shall save Board harmless from all loss, claim, expense or damage on account thereof.

ARTICLE 14 - CONNECTIONS WITH UTILITY SERVICES

Prior to any work being connected to receive service from any utility, whether owned privately or publicly, all requirements of that utility shall be complied with by Contractor, who shall be held responsible for determining the extent of such requirements, and who shall pay all fees and charges involved, unless Board has made other arrangements under the terms of this contract.

ARTICLE 15 - INSPECTION OF WORK AND CERTIFICATES OF APPROVAL

Engineer and his representatives shall at all times have access to the work in preparation or progress for the purpose of inspecting the work regarding compliance with the plans and specifications, and Contractor shall provide proper facilities for such access and for inspection. The presence or absence of Engineer or his representative does not relieve in any degree the responsibility or obligation of Contractor.

If the specifications, Engineer's instructions, laws, ordinances, or any public authority require any work to be specially tested or approved, Contractor shall give Engineer timely notice of its readiness for inspection, and if the inspection is by an authority other than Engineer, of the date fixed for such inspection. If any work should be covered up without approval or consent of Engineer, it must, if required by Engineer, be uncovered for examination at Contractor's expense.

All tests and inspections of electrical installations and of water lines shall be made, and other requirements of authorities having jurisdiction shall be met before acceptance of the work by the Engineer.

Contractor shall remove, rebuild and make good at his own cost all work which is found to be defectively executed, or otherwise not in conformity with contract requirements, including repair or replacement of materials or other property of Board injured or destroyed by him. Failure to condemn work at the time of its construction shall not be construed as an acceptance of defective work. If any doubt exists as to quality of workmanship of such work, Contractor must, on order of Engineer, remove or expose such work for examination. Upon such examination, if the work is found to be imperfect, or otherwise not in conformity with the requirements of the contract, it must be corrected by Contractor at his sole cost, risk and expense; if, however, such work is found to be satisfactory upon such inspection, the actual cost of removing and replacing, plus an allowance for overhead and profit on a percentage basis, as provided in GENERAL CONDITIONS - ARTICLE 43, shall be paid to Contractor by Board (except when the work was covered up without approval or consent of Engineer and was ordered to be uncovered by Contractor, as aforesaid).

ARTICLE 16 - PERMITS AND REGULATIONS

All permits of a temporary nature and licenses of a temporary nature necessary for the prosecution of the work shall be secured and paid for by Contractor. The Contractor shall obtain a permit from, and follow the procedures of, the New Orleans Sewerage and Water Board (SW&B) for all plumbing work on Board property which connects into SW&B's municipal potable water supply or discharges into the municipal sewerage system.

The Board will obtain permits and/or letters of no objection from governmental agencies for the permanent work including those from the Corps of Engineers, Orleans Levee Board, LADOTD, LADNR, LADEQ, U. S. Coast Guard, etc. and railroad companies as applicable. A City of New Orleans building permit is not required. Contractor shall comply with the City of New Orleans Municipal Code, Chapter 42A "Community Noise Control" regarding noise from pile driving and other construction operations.

Contractor shall give all notices and shall comply with all laws, ordinances, rules and regulations bearing on the conduct of the work. If Contractor observes that the drawings or specifications, or both, are at variance with laws and regulations, he shall promptly notify Engineer in writing, and any necessary changes shall be adjusted as provided in the contract for changes in the work. After the discovery of any such variance, Contractor shall not proceed with any part of the work thereby affected, and he shall neither start nor resume work thereon until the variance has been removed by Engineer and Contractor notified in writing of the removal.

Contractor, his employees, and all engaged in the prosecution of this work shall be legally qualified for engaging in public work.

ARTICLE 17 - PROTECTION OF WORK AND PROPERTY

Contractor shall provide and maintain all necessary flagmen, watchmen, barricades, warning lights, signs and other suitable protective devices, together with marking buoys and other navigational aids, as required, and shall take all other necessary precautions for the protection and safety of the work and the public against personal injury (including death) and property damage. He shall continuously maintain adequate protection of all work from damage, and shall take all reasonable precautions to protect the Board's properties from damage or loss arising in connection with this contract. He shall make good any and all damage, injury or loss resulting from his failure to provide such necessary protective precautions, except such as may be directly due to, or caused by agents or employees of the Board. He shall adequately protect adjacent private and public property.

In an emergency affecting the safety of life, of the work, or of adjoining property, Contractor is, without special instructions or authorization from Engineer, hereby required to immediately take all necessary measures to prevent such threatened damage, loss or injury.

The responsibility of Contractor under this Article shall continue until final written acceptance of the project by Engineer, except as to those portions of the work for which Engineer has issued to Contractor a certificate of completion in accordance with GENERAL CONDITIONS - ARTICLE 25, or when areas of partially completed construction are taken over for an interim period, as provided in GENERAL CONDITIONS - ARTICLE 25.

ARTICLE 18 - SUPERINTENDENCE AND SUPERVISION

Contractor shall keep on the Fabrication Site and Erection Site of the work project, at all times during its progress, a competent superintendent and any necessary assistants, all satisfactory to Engineer. Said superintendent shall have full authority from Contractor to carry out all orders given by Engineer, and shall exercise active supervision of all work performed under this contract, including work subcontracted, and shall not be transferred from this project to other work (even partially) without the approval of Engineer. Directions shall be confirmed in writing upon written request in each case. Contractor shall give efficient supervision to work, using his best skill and attention. During the construction and maintenance period of the work of this contract, all orders given by Engineer or his representatives to the manager, superintendent, or foreman of Contractor, in the absence of Contractor, shall have the same force and effect as given to Contractor.

Neither party shall employ or hire any employee of the other party without the other party's consent.

ARTICLE 19 - CHANGES IN THE WORK

Engineer shall have the right to make alterations in the quantity, lines, grades, plans, details or dimensions of the work herein contemplated, either before or

after the commencement of the work and without notice of Surety, but subject to adjustment in payments as provided under GENERAL CONDITIONS - ARTICLE 43. If such alterations diminish the quantity of work to be done, they shall not constitute a claim for damages for anticipated profits for the work dispensed with, but when the reduction in amount is a material part of the work contemplated, Contractor shall be entitled to compensation, as determined by Engineer, for overhead and equipment charges which he may have incurred in expectation of the quantity of work originally estimated, unless otherwise specifically provided herein; if such alterations increase or decrease the amount of work estimated for a unit price work item shown on the Unit Price Form, the Contractor shall be paid according to the quantity of work actually performed as field measured and as verified by the Board, and at the unit price stated on the Unit Price Form for such work under this contract. If, however, the character of the work, or in case no costs thereof are materially changed, an allowance shall be made on such basis as may have been agreed to in advance of the performance of the work, or in case no such basis has been previously agreed upon, then an allowance shall be made either for or against Contractor, in such amount as Engineer may determine to be fair and equitable.

This Article is understood as providing for alterations that do not decrease the total sum to be paid under the contract by more than twenty-five percent (25%) nor increase said sum by more than fifty percent (50%).

ARTICLE 20 - SUSPENSION OF WORK

Board may at any time suspend the work, or any part thereof, giving notice to Contractor in writing specifying the date work is to be suspended. The work shall be resumed by Contractor within ten (10) calendar days after the date fixed to resume work in the said written notice, or in a supplementary written notice, from Board to Contractor.

Board shall reimburse Contractor for reasonable expense incurred by Contractor in connection with the work under this contract as a result of such suspension, the amount of such reasonable expense to be approved by the Engineer, unless such suspension is ordered to secure compliance with the terms of this contract.

If the work, or any part thereof, shall be stopped by the notice in writing aforesaid, and if Board does not give notice in writing to Contractor to resume work at a date within ninety (90) calendar days of the date fixed in written notice to suspend, then Contractor may abandon that portion of the work so suspended, provided that Contractor shall have given Board thirty (30) calendar days written notice of such intent prior to the termination of the said ninety (90) calendar day period, unless such suspension had been ordered to secure compliance with the terms of this contract. Contractor will be entitled to the estimates and payments, if any be due, and as determined by Engineer, for all completed portions of the work so abandoned.

ARTICLE 21 - BOARD'S RIGHT TO DO WORK

If it shall appear to Engineer that the progress of any portion of the work is not sufficient to insure satisfactory completion of the contract within the time herein designated, or within any additional time which may have been granted, or that any portion of the work is not executed or is not being executed in compliance with the specifications or plans, then Engineer shall notify Contractor in writing to remove all cause of complaint within the time specified in such notice. If Contractor fails so to do, Engineer may proceed to complete such portion of the work in such manner as he may determine. All cost of such work shall be deducted from any money due, or which may become due, to Contractor under this contract.

ARTICLE 22 - BOARD'S RIGHT TO TERMINATE CONTRACT

If Contractor should become insolvent, or be adjudged bankrupt, or if he should make a general assignment for the benefit of his creditors, or if, being a corporation, a receiver should be appointed for Contractor, or if he should persistently or repeatedly refuse or fail, except in cases for which extension of time is provided, to supply enough properly skilled workmen or proper materials, or if he should fail to make prompt payment to subcontractors or for material or labor, or persistently disregard laws or ordinances or the instructions of Engineer, or should cease operations under this contract at any time for more than ten (10) calendar days, or otherwise be guilty of a substantial violation of any provision of the contract, then Board, upon the certificate of Engineer that sufficient cause exists to justify such action, may without prejudice to any other right or remedy and after giving Contractor and his Surety seven (7) calendar days written notice, take possession of the premises and of all materials, tools and appliances thereon, and finish the work by whatever method it may deem expedient. In such case, Contractor shall not be entitled to receive any further payment until the work is finished. If the unpaid balance of the contract price shall exceed the expense of finishing the work, including compensation for additional managerial and administrative services, such excess shall be paid to Contractor. If such expense shall exceed such unpaid balance, Contractor and Surety shall pay the difference to Board. The expense incurred by Board, as herein provided, and the damage incurred through Contractor's default, shall be certified by Engineer.

ARTICLE 22-A - BOARD'S RIGHT TO TERMINATE CONTRACT FOR ITS CONVENIENCE

The Board, by written notice, may terminate this contract in whole or in part when it is in the interest and for the convenience of the Board. Any such termination shall be effected by delivery to the Contractor of a Notice of Termination specifying the extent to which performance of work under this contract is terminated and the date on which the termination is effective.

After receipt of a Notice of Termination, the Contractor shall:

(1) Stop work immediately;

(2) Place no further orders for materials or services;

(3) Settle any outstanding liabilities arising out of the termination of subcontracts with the approval of the Engineer:

(4) Turn over to Board, if directed by the Engineer, fabricated or unfabricated parts, supplies, and other materials produced or acquired in connection with the contract so terminated;

(5) Complete whatever portion of the work in progress as shall not have been terminated.

The Contractor and the Board may agree upon the amount to be paid the Contractor because of the termination pursuant to this clause, which amount may include a reasonable allowance for profit on work done. The contract shall be amended accordingly and the Contractor paid the agreed amount upon certification by the Engineer.

ARTICLE 23 - CONTRACTOR'S RIGHT TO STOP WORK OR TERMINATE CONTRACT

If the work should be stopped under an order of any court or public authority, for a period of ninety (90) calendar days, through no act or fault of Contractor or of anyone employed by him, or, except as provided in GENERAL CONDITIONS - ARTICLE 42, if Engineer should fail to issue any estimate for payment within sixty (60) calendar days after it is due, or if Board shall fail to pay to Contractor within a reasonable time any sum certified by Engineer, then Contractor may, upon seven (7) calendar days written notice to Board and Engineer, stop work or terminate this contract and recover from Board payment for all work executed and any loss sustained.

ARTICLE 24 - REMOVAL OF EQUIPMENT

In case of termination of this contract before completion from any cause whatsoever, Contractor, if notified to do so by Board, shall promptly remove any part or all of his equipment and supplies from the property of Board. Should Contractor fail to make such removals, Board shall have the right to remove all such equipment and supplies at the expense of Contractor.

ARTICLE 25 - USE OF COMPLETED WORK PRIOR TO FINAL ACCEPTANCE

Without in any way invalidating this contract, Board shall have the right to take possession of and to use any portion of the work at any time, as hereinafter provided.

If, at any time, any portion of the permanent construction has been substantially and satisfactorily completed in accordance with the plans and specifications, and if Engineer determines that such portion of the permanent construction is not required for the operations of Contractor, but is needed by Board, Engineer shall issue to Contractor a certificate of completion for such portion, and thereupon or

at any time thereafter Board may take over and use said portion of the permanent construction described in such certificate, and may exclude Contractor therefrom.

When all of the work has been substantially and satisfactorily completed in accordance with the plans and specifications, Engineer may issue to Contractor a certificate of completion, and thereupon or at any time thereafter Board may take over and use the work and may exclude Contractor therefrom. At the time of such takeover and until the contract is formally accepted by the Board as complete, and during such further periods thereafter as any payment provided for under the contract shall remain unpaid by the Board, the insurance coverage shall continue but only to the extent of the amount remaining unpaid.

If at any time, it is determined by Board that the interim use by Board of parts of staging area is necessary as a temporary measure, Engineer shall issue a written notice to Contractor stipulating this need and thereupon, or at any time thereafter, Board may take over and use such area as described in said notice, and may exclude Contractor therefrom. Such area taken over by Board for interim use shall be returned to custody of Contractor for completion of construction upon termination of Board's need for the area. The entire area used shall be returned to Contractor in its original condition, otherwise Board will be fully responsible for all expense incurred in restoring said area to such original condition.

When completed portions of permanent construction are taken over by Board, or when parts of staging area are taken over for an interim period, then in both cases Contractor's obligation as stipulated under GENERAL CONDITIONS - ARTICLE 17 of these documents shall immediately cease within the stipulated areas of Board use, until such time as Board returns such parts of staging areas to the custody of Contractor.

The guarantee period provided in GENERAL CONDITIONS - ARTICLE 30 for all work satisfactorily completed in areas taken over by Board for permanent use shall begin at time of issuance by Board to Contractor of certificate of completion of such areas.

Contractor's performance bond may be reduced at time of issue by Board of certificate of completion for a completed area of the work. The amount of such reduction shall be equal to the contract bid price value of the work covered in the certificate of completion, provided that the performance bond shall never be reduced to less than fifty percent (50%) of the contract amount. If such prior use increases the cost of or delays the work, Contractor shall be entitled to extra compensation, or extension of time, or both, as determined by Engineer.

ARTICLE 26 - WARRANTY

The Contractor warrants that during the Warranty Period, as defined below, each Crane and each component of each Crane shall:

(i) be free from errors, defects and damage in design, material and workmanship,

(ii) conform to the requirements of this Contract Document, including the Specifications
(iii) be new unless the Board agrees otherwise in writing,
(iv) be of good quality and good condition, and
(v) be delivered, handled, stored (whether at the Fabrication Site, Erection Site or otherwise) and installed in accordance with all manufacturer's instructions and in a manner that does not void or impair manufacturer warranties.

The Warranty Period for each Crane shall be for:
(i) the period of five (5) years from the Substantial Completion Date for such Crane for the electrical equipment supplied by the drive manufacturer,
(ii) the period stated in the manufacturer's warranty for components that are purchased by the Contractor from the manufacturer thereof and covered by the manufacturer's warranty, which period will not commence until Substantial Completion of each Crane containing such components and will last at least until the first anniversary of Substantial Completion.
(iii) the period of five (5) years from the Substantial Completion Date for such Cranes for the remainder (including the structure and all other mechanisms and components),

provided that the warranty for any replacement or repair occurring during either such five (5) year period, as applicable, will last until the later of (a) six (6) months after such replacement or repair occurs and (b) the remaining unused portion of such five (5) year period, as applicable.

The Contractor shall obtain written warranties for the benefit of the Contractor and the Board from each supplier, vendor, and Subcontractor in relation to its portion of the Work that are consistent with the Contractor's warranty to the Board herein and warrant against defects and deficiencies in any supplier, vendor's and Subcontractor's work or goods. The Contractor shall provide promptly to the Board copies of all Subcontractor warranties obtained by the Contractor. Those warranties shall provide that they survive any tests by the Board and the Contractor, inspections and approvals and shall be assignable to the Board. For the avoidance of doubt, this warranty does not extend to consumables.

If, within the Warranty Period, deviations from, breaches of, or failure of the foregoing warranties ("Defects") are found, the Contractor shall, at its sole expense and promptly upon being given notice thereof, correct, repair, modify, or replace those Defects, including repair, disassembly, removal, transportation, re-assembly or re-performance of any affected portion of any Crane and the Work and shall demonstrate to the satisfaction of the Board that the Defects have been properly corrected. The Contractor shall remedy any failure or breach of any warranty so as to minimize revenue loss to the Board and avoid disruption of the Board's operations at the Board's site. If the Contractor fails to initiate and diligently take steps to pursue corrective action upon the Contractor's receipt of the Board's notice and to pursue that corrective action continuously thereafter, the Board may undertake or arrange corrective action at the Contractor's expense. If the Board makes a good faith determination that corrective action is

necessary in a shorter time than that provided in this Section or as may be provided by the Contractor, it shall immediately notify the Contractor of such need and the Board may undertake or arrange corrective action at the Contractor's expense. The correction of a Defect by the Board pursuant to the previous sentences shall not limit or void the Contractor's warranties, provided that the correction of the Defect by the Board is in accordance with generally accepted industry practices.

For any applicable warranty to be enforceable by the Board against the Contractor, with respect to any Defect, such Defect must not have occurred as a result of the application Crane(s):

(i) not having been maintained by the Board to the reasonable standards provided by the Contractor to the Board in writing

(ii) not having been operated and maintained by competent personnel of the Board

(iii) having been overloaded or stressed beyond Specifications or

(iv) having suffered casualty by force majeure (to the extent that the Specifications do not cover the risk of such force majeure), or negligent, wanton, military or unlawful act of any party (other than the Contractor, any Subcontractor and any person for whom the Contractor or any Subcontractor is responsible).

The Board may negotiate and enter into with the Contractor a yearly inspection or maintenance service agreement which will reflect the Contractor's continuing interest in proper maintenance and overhaul of each Crane.

In the event later inspection demonstrates that a Defect did not exist or that the Contractor was not liable for such Defect, the costs of remedying such Defect, whether made by the Contractor or others, will be for the Board's account, and the Board will further reimburse the Contractor for its substantiated necessary costs incurred by the Contractor in making its inspection.

In the interest of confirming proper initial set-up and Crane operation, the Contractor will provide onsite support at the Erection Site for a minimum of three (3) months after the Substantial Completion Date of each Crane.

ARTICLE 27 - INDEMNITY

Contractor shall protect, defend, indemnify, and keep, save, and hold harmless the Board from any and all losses, costs, claims, damages, demands, attorney's fees, expenses, penalties , fines, suits and actions of any kind and nature arising out of any accident or any occurrence, negligent or otherwise, including environmental liability, causing injury including death, to any person or persons or damage to property, directly or indirectly caused by, resulting from, or growing out of the performance of his obligations under this contract, whether caused by his affiliates, his subsidiaries or his employees, servants, agents, representatives or subcontractors, including such as may be imposed for the violation of any law, ordinance, or regulation (federal, state or local); and Contractor shall defend and indemnify the Board from and against any and all costs and expenses in connection with the foregoing, including court costs, related litigation expenses,

and reasonable attorney's fees that may be incurred by the Board, provided however, that nothing herein shall be construed as indemnifying the Board against its own negligence or that of its officers, agents, servants, or employees when such negligence (as determined by final judgment of a court of competent jurisdiction) is the direct cause of such loss, damage, injury or death and when there is no negligence on Contractor's part which is a contributing cause of such loss, damage, injury or death. Contractor hereby acknowledges that the duty to defend is a separate and distinct obligation herein and, on the filing of any action, claim, suit or proceeding of any nature or kind against Board, shall defend the Board from and against any and all of the foregoing actions, claims, or suits of whatever nature or kind, directly or indirectly caused by, resulting from, or growing out of Contractor=s performance of its obligations under this Contract, whether or not there is insurance coverage for the actions, claims or suits. Furthermore, Contractor shall be liable for attorney's fees and costs incurred by the Board if it must file suit or retain counsel to enforce the terms of this indemnity. The Board shall notify Contractor of any claim, demand, suit or other action brought or raised against the Board for which Contractor may be liable as stated above. The provisions of this indemnity shall survive this Contractor and are intended to be severable. If any term or provision should be determined invalid or unenforceable for any reason, that invalidity or unenforceability shall not affect the validity or enforceability of the remainder of the terms of this indemnity.

ARTICLE 28 - BOARD'S INSURANCE

Board may, at its option and at its expense, procure and maintain such insurance as will protect it from its contingent liability for damages for personal injury, including death, which may arise from operations under this contract.

ARTICLE 28A - FORCE MAJEURE

Contractor shall not be in default in the performance of any obligation undertaken on this Contract if performance is rendered impossible or delayed because of any Force Majeure, but for no longer time period. As used in this contract, Force Majeure shall include but not be limited to acts of God, lightning, earthquakes, hurricanes, strikes, fires, storms, epidemics, riots, labor disputes, civil insurrections, wars acts of terrorism, or any other cause not within the reasonable control of the Contractor and occurring without its fault. Any delay caused by such a Force Majeure shall not be recognized unless Contractor notifies the Board in writing within ten working days after the occurrence of the Force Majeure. Contractor shall use commercially reasonable efforts to remedy the effects of the Force Majeure with all due diligence. Neither economic impracticality nor the inability of the Contractor to perform in whole or in part for economic reasons shall be considered loss under this Article.

ARTICLE 29 - UNPAID WAGES

Whenever, in the opinion of Engineer, it may be necessary for the progress of the work to secure to any of the employees engaged in the work under this contract any wages which may be then due them, Board is hereby authorized to pay the

employees the amount due them or any lesser amount, and the amount so paid them, as shown by their receipts, shall be deducted from any moneys that may be or become payable to Contractor.

ARTICLE 30 - PERFORMANCE BOND AND CONTINUING OBLIGATIONS

Contractor shall furnish a good and solvent bond either in the form attached hereto and forming part of this contract or on a form acceptable to Board to insure prompt and proper performance of all of the objectives imposed on Contractor under the contract in an amount equal to the total amount of the contract, except as provided under La. R.S. 38:2216(C). The bond shall be cancelled and the surety released only in accordance with the provisions of law and of this contract.

Under the bond and as a guarantee against faulty materials or workmanship and the negligence of Contractor, the responsibility of Contractor and Surety shall continue as provided by law after a certificate of completion of work has been issued by Board to contractor as provided in GENERAL CONDITIONS - ARTICLE 25 hereof or after final acceptance when no certificate of completion is given. Consistent with its obligations arising under this Contract and the Public Works Act., La. R.S. 38:2211 et seq., Contractor shall, at its expense, remedy any and all defects which appear after issuance of certificate of completion (with respect to the particular portion of the work affected if certificate of completion was issued for that portion separately from the whole of the work) or after final acceptance as the case may be, and Contractor shall replace defective materials and equipment and shall pay for all damage to other work resulting therefrom. Board shall give notice to Contractor of any and all observed defects with reasonable promptness.

ARTICLE 31 - CLAIMS BY CONTRACTOR FOR ADJUSTMENT; DISPUTES

Should Contractor be of the opinion, at any time, that additional compensation is due him for work or materials not clearly covered in this contract or not previously ordered by Engineer as extra work, as defined herein, Contractor shall notify Engineer in writing of his intention to make claim for such additional compensation before he begins the work on which he bases the claim. If such notification is not given and Engineer is not afforded proper facilities by Contractor for keeping strict account of actual cost as required, then Contractor shall thereby automatically forfeit his right to such additional compensation.

Such notice by Contractor and the fact that Engineer has kept account of the cost as aforesaid shall not in any way be construed as proving or substantiating the validity of the claim. If the claim, after consideration by Engineer, is found to be just, it will be paid for as extra work in accordance with GENERAL CONDITIONS - ARTICLE 43. Nothing in this Article shall be construed as establishing any claim contrary to the terms of GENERAL CONDITIONS - ARTICLE 19.

Except as provided above in this Article, should Contractor be of the opinion, at any time, that he has sustained damage or has incurred additional costs, for which he may be due compensation under this contract, he shall, within thirty

(30) calendar days after sustaining, or after ascertaining the probable existence of, such damage, make a written statement to Engineer of the nature of the damage claimed. Engineer shall thereupon render a decision in the matter.

ARTICLE 32 - TEMPORARY WORK AND STORAGE AREAS

Contractor shall provide such temporary construction facilities and areas as are required for execution of the work and storage of his equipment and material, together with means of access to same, all at Contractor's cost, except as may be otherwise provided in the Special Conditions of this contract or by written advice of Engineer.

ARTICLE 33 - ASSIGNMENT

Contractor shall not assign this contract or subcontract it as a whole or contrary to the provisions of SPECIAL CONDITIONS - ARTICLE 8, without the prior written consent of Board, and only when Engineer of Board determines that it would be to the advantage of the Board.

ARTICLE 34 - RIGHTS OF VARIOUS INTERESTS

Wherever work being done by Board's forces or by other contractors is contiguous to work covered by this contract, the respective rights of the various interests involved shall be established by Engineer.

ARTICLE 35 - WORK UNDER SEPARATE CONTRACTS AND BY BOARD'S FORCES

Board reserves the right to let other contracts in connection with this work, and to do additional work at the site with its own forces. Contractor shall afford other Contractors and Board's forces reasonable opportunity for the introduction and storage of their materials and the execution of their work, and shall properly connect and coordinate his work with theirs.

If any part of Contractor's work depends for proper execution or results upon the work of any other party, Contractor shall inspect and promptly report to Engineer any and all defects in such work that render it unsuitable for such proper execution and results. His failure to inspect and report shall constitute an acceptance of the other party's work as fit and proper for the reception of his work except as to defects which may develop in the other party's work after the execution of his work.

ARTICLE 36 - SUBCONTRACTORS

Contractor shall, as soon as practicable after the signing of the contract, notify Engineer in writing of the names of subcontractors proposed for the work and shall not employ any that Engineer may, within ten (10) calendar days, object to as incompetent or unfit because of unsatisfactory previous performance on contracts for Board or for others. Such unsatisfactory performance will constitute the only cause for rejection by Engineer of a subcontractor proposed by

Contractor for employment on the project except that sub-contractors performing work valued at $50,000 or more shall be licensed in accordance with L.A. R.S. 37:2163.

Contractor shall be fully responsible to Board for the acts and omissions of his subcontractors and of persons either directly employed by them, as he is for the acts and omissions of persons directly employed by him.

Nothing contained in the contract documents shall create any contractual relation between any subcontractor and Board.

ARTICLE 37 - SURVEYS, ALIGNMENT, BENCH MARKS AND ENGINEER'S CHECKS

When, in the opinion of Engineer, a property boundary survey is necessary for the proper conduct of the work, Board will furnish such survey at its expense, unless specifically provided otherwise in contract documents.

When needed, Board will also establish, on or adjacent to the site of the work, a base line with starting point thereon, and one or two bench marks, but Contractor shall be responsible for making, with his own engineers, all other measurements required in laying out and controlling his work.

Contractor shall carefully preserve Board's bench marks, reference points and stakes, and in case of willful or careless destruction he shall be charged with the expense of restoring them, and Contractor shall be responsible for any and all mistakes that may be caused by their unnecessary loss or disturbance.

At his discretion, Engineer may check Contractor's work for proper alignment and grade at any time, but the making of such check or checks shall not be assumed either to establish a precedent requiring similar checking by Engineer at any other time, or to relieve Contractor from full responsibility for the correctness of his work.

ARTICLE 38 - ENGINEER'S STATUS

Engineer shall represent the Board in the execution of all work under the contract and he may perform technical inspection of the work as, at his discretion, is necessary in the best interest of the Board. He has authority to stop the work whenever such stoppage may be necessary to insure the proper execution of this contract. He shall also have authority to reject all work and materials which do not conform to this contract. He shall verify and approve amount, quantity or classification of work or materials for which Board will make payment to Contractor.

ARTICLE 39 - ENGINEER'S DECISIONS

Engineer shall, within a reasonable time after their presentation to him, make decisions on all claims of the Board or the Contractor. He shall render decisions on all other matters relating to the execution and progress of the work or the

interpretation of the contract documents, whenever such decisions are necessary for the proper conduct of the work. Should the Contractor disagree with the decision made by an Engineer's assistant or consultant he shall request an Engineer's decision. All decisions of Engineer, when so requested, shall be rendered in writing. Except as provided under GENERAL CONDITIONS - ARTICAL 40, Engineer's decision in all matters under his jurisdiction shall be accepted as final and conclusive.

ARTICLE 40 - REVIEW OF DECISIONS

Should Contractor object to any decision, other than as to technical engineering questions, rendered by Engineer, Contractor may appeal, in writing, to Board for a review of such decision. Within thirty (30) calendar days after receipt of such appeal, Board shall afford opportunity to Contractor to appear before it or before any committee or any executive designated by Board, for the purpose of a hearing on the objections previously submitted in writing. The decision of Board on such appeal shall be final and conclusive, subject however to Contractor's option to appeal any adverse decision to a court of competent jurisdiction as provided by applicable law.

ARTICLE 41 - FINAL CLEANING UP

Contractor shall, after completion of the work, and prior to final inspection and acceptance by Board, remove and satisfactorily dispose of all temporary structures, false work, debris, tools, equipment and materials left over and not incorporated into the work, except that valuable surplus materials furnished by Board and materials furnished by Board and designated to be salvaged shall be delivered by Contractor to a designated Board storage area within the Port. The site of the work shall always be left in a clean, well drained condition, with the work itself in a finished, complete and satisfactory state. Building floors, decks, paved areas and similar finished surfaces shall be left broom clean.

ARTICLE 42 - PAYMENTS WITHHELD AND DEDUCTIONS

Board may withhold or, on account of subsequently discovered evidence, nullify the whole or a part of any certificate to such an extent as may be necessary to protect itself from loss on account of:

(a) Defective work not remedied.

(b) Claims filed against Contractor or reasonable evidence indicating probable filing of claims.

(c) Failure of Contractor to make payments promptly to subcontractors or for material or labor. Contractor shall furnish full and satisfactory evidence, when called upon by Board, that all persons having done work or furnished materials hereunder, and for which Board may be liable, or for which a lien has been or might be filed, shall have been paid or satisfactorily secured.

(d) A reasonable doubt that the contract can be completed for the balance then unpaid.

(e) Damage to another contractor.

When the above grounds are removed, payments shall be made for amounts withheld because of them.

If Engineer deems it inexpedient to correct work injured or done not in accordance with the Contract, an equitable deduction from the contract price shall be made therefore.

ARTICLE 43 - EXTRA WORK AND PAYMENT THEREFORE

When Contractor is directed to perform work, including furnishing of materials as required, which is neither shown on the drawings nor reasonably implied elsewhere in the contract documents, and for which no price has been named in the agreement for work or materials of like character, such items shall be considered as extra work, and shall be performed by Contractor to the satisfaction of Engineer.

Extra payment will positively not be made for materials or work indicated in the contract documents, or which can be predetermined from careful pre-bid examination by Contractor, nor for miscellaneous and incidental materials and work required for repairs and replacements.

Payment for extra work, including materials, will not be allowed unless approved in advance, in writing, by Engineer.

Terms of payment for extra work will be the same as for work stipulated in the agreement.

The value of all such extra work, or change, for which full payment is to be made, shall be determined by the unit prices named in the contract, ONLY IF unit prices were shown on the Unit Price Form and if the scope of work is not altered beyond the limits established by GENERAL CONDITIONS - ARTICLE 19; otherwise said value shall be determined through mutual agreement by one or more of the following methods:

(a) By estimate and acceptance in a lump sum. The estimate shall be fully documented and itemized as to costs, including material quantities, material costs, taxes, insurance, employee benefits, other related costs, plus an allowance for profit and overhead on a percentage basis as hereinafter provided.

(b) By unit prices subsequently agreed upon. Such unit prices shall be fully documented and itemized as to costs, including material quantities, material costs, taxes, insurance, employee benefits, other related costs, plus an allowance for profit and overhead on a percentage basis as hereinafter provided.

(c) By actual cost, plus an allowance for overhead and profit on a percentage basis as hereinafter provided.

Method (c) will be used only when Methods (a) or (b) are not practical or not in the best interest of Board. If method (c) is agreed on, Contractor shall keep an accurate account of his actual costs, as defined below, together with supporting invoices and payroll records, and shall present them in such form as Engineer may direct. Actual reimbursable costs for extra work shall include the incurred costs of actual labor and materials charges. Labor charges shall include actual payroll cost of labor, mechanics and foremen used on the extra work, together with those additional expenses directly based on payroll, such as workers' compensation insurance, social security, payroll taxes, welfare and other fringe benefits. No part of the time of supervisory, engineering, clerical or general utility employees, nor of executive personnel, not previously and regularly assigned to the project, shall be included in the payroll charges for extra work unless their employment is used solely on the extra work and is authorized in advance, in writing, by Engineer. Cost of materials shall include actual net invoice amounts, after allowance for trade discounts, together with other incidental costs such as freight and transportation charges, sales and use taxes. Cost of all manual hand tools together with mechanically, electrically or pneumatically operated hand tools with manufacturer's power rating not exceeding two (2) horsepower will be considered as part of the charge included in the provision for overhead. All hand tools in excess of two (2) horsepower rating will be paid for at rental rates not in excess of those current and prevailing in the New Orleans area.

Large construction equipment shall be paid for during time when used exclusively on extra work and at rental rates not in excess of those shown in the "Compilation of Rental Rates for Construction Equipment," latest revision, prepared by Associated Equipment Distributors, 30 East Cedar Street, Chicago Illinois, and subject to approval by Engineer. In the absence of a listing of such equipment in the foregoing publication, charges for such unlisted equipment shall be agreed upon in advance and confirmed in writing by Engineer. The rental rates shall be the lowest applicable to the period during which they are in use. Taxes, if any, applicable to rental shall be added. The foregoing charges shall be understood to include all overhead and profit on such large equipment. If such large equipment is transported to and from the job site solely for the extra work, usual charges, if any, as approved as aforesaid, shall be added for handling to and from said job site. Fuel and lubricants furnished by Contractor and used in operations solely for extra work shall be added to the foregoing at actual delivered prices paid for them.

The wages of operators for large equipment for periods of extra work shall be carried in the labor payroll for such work and excluded from the rentals of equipment. All rental equipment shall be in first class condition when

delivered to site. No payment will be made for equipment repairs and operators' time during periods of repair caused by the following:

(1) Normal wear and tear.

(2) The furnishing of defective or inadequate equipment.

(3) Lack of or improper servicing of equipment.

(4) Improper operation of equipment.

When extra work is required and is compensated for under any of the three (3) methods (a), (b) or (c) above which is normally performed by a subcontractor, and no capable subcontractor is already on the project, Contractor shall secure competitive bids and shall award the work to the lowest responsible bidder, all subject to the approval of Engineer. If a qualified subcontractor is already employed on the project, that subcontractor shall perform any such extra work required, subject to the terms and conditions of this Article, and shall keep such records of labor, material and equipment charges as shall be required.

In order to adequately reimburse Contractor, together with subcontractors if any, for overhead and profit on the extra work as herein above defined in methods (a), (b) or (c), the following percentages will be utilized as full compensation for all general office, construction office and plant overhead, and profit:

(a) On Contractor's aggregate cost of labor and materials, when no subcontractor is involved, a single twenty percent (20%) allowance for both overhead and profit.

(b) On each subcontractor's aggregate cost for labor and materials, a single fifteen percent (15%) allowance for both overhead and profit for subcontractor, in addition to a single eight percent (8%), allowance for both overhead and profit for Contractor. The Contractor's eight percent (8%) shall be computed on the subcontractor's cost after the subcontractor's fifteen percent (15%) has been added.

No verbal order or suggestion given by an employee of Board shall be construed as authorizing or being the basis for any claim on the part of Contractor for extra compensation, either for extra work, materials or equipment, or for damages because of Contractor's compliance therewith. Extra work will constitute the basis for additional compensation to Contractor only when such work is duly authorized as provided under GENERAL CONDITIONS - ARTICLE 19. In case of dispute as to what does or does not constitute extra work, a decision will be made by Engineer.

ARTICLE 44 - ENGINEER'S CERTIFICATES, PAYMENTS AND ACCEPTANCE

(i) - Unless otherwise provided for, payments shall be made only on amounts certified by Engineer as being due under the terms of the Contract, from which,

however, Board may make deductions of such amounts as may be required to protect it from claims.

(ii) - The issuance of any payment certificate by Engineer or the payment of any moneys to Contractor, whether due under the contract or not, shall not be considered or construed as an acceptance by Board of the work either in whole or in part, and the said work shall remain at the sole risk of Contractor until it is finally completed and accepted in accordance with these contract documents.

(iii) - Neither Contractor nor Surety shall be released from the whole or any part of the obligations herein assumed by reason of any change in the amount, nature, scope, character or extent of the work, or in any plan or specification, or in the mode or time of payment, or by any extension of time or indulgence granted to Contractor, even though any or all of said acts be without the knowledge and consent of Contractor or Surety, unless such release be expressly made in writing by Board.

(iv) – Board shall make payment to the Contractor for the work and all other services in accordance with the following schedule, based on partially erect delivery, which shall apply to both Cranes:

Payment No.	Contract Price	Milestone
1	10%	1. Execution of this Agreement
2	10%	1. Acceptance by Board of the Crane design 2. Agreement upon Inspection & Testing Plan (ITP) 3. Verification (copy of purchase orders) of order of major components
3	10%	1. Verification of raw materials at Fabrication Site and fabrication in progress 2. Verification of compliance with ITP 3. Verification of quality control and quality assurance procedures in accordance with Contract
4	10%	1. Completion of main structure fabrication 2. Verification of delivery of major components
5	10%	1. Completion of all fabrication and major component subassemblies 2. Successful completion of all items in the Fabrication Site Test & Checkout Manual 3. All Non Conformance Reports closed and Contractor acceptance of punchlist items 4. Contractor acceptance of Pre-shipment Certificate. 5. Safe loading and securing of the Crane and components on the vessel. 6. Vessel departure from Fabrication Site.

6	10%	1. Safe arrival and offload of Crane at the Erection Site. 2. Delivery of spare spreader 2. Full mobilization by the Contractor's personnel and Louisiana licensed erection sub-contractor at the Erection Site. 3. Board acceptance of the Contractors erection, testing, & commissioning daily project schedule.
7	20%	1. Completion of final erection of the Crane. 2. Start of Performance and Acceptance Testing
8	10%	1. Successful completion of all items in the Erection Site Test & Checkout Manual 2. Contractor agreement to punchlist items remaining 3. Delivery of all spare parts 4. Completion of training 5. Contractor receipt/acceptance of Substantial Completion Certificate
9	10%	1. Completion of all remaining punchlist items 2. Delivery of all required documentation 3. Contractor receipt/acceptance of Final Acceptance Certificate

If the Contractor offers fully erect delivery of the Crane(s), the payment terms shall be:

Payment No.	Contract Price	Milestone
1	10%	1. Execution of this Agreement
2	10%	1. Acceptance by Board of the Crane design 2. Agreement upon Inspection & Testing Plan (ITP) 3. Verification (copy of purchase orders) of order of major components
3	10%	1. Verification of raw materials at Fabrication Site and fabrication in progress 2. Verification of compliance with ITP 3. Verification of quality control and quality assurance procedures in accordance with Contract
4	10%	1. Completion of main structure fabrication 2. Verification of delivery of major components
5	20%	1. Successful completion of all items in the Fabrication Site Test & Checkout Manual 2. All Non Conformance Reports closed and Contractor acceptance of punchlist items 3. Contractor acceptance of Pre-shipment Certificate.

		4. Safe loading and securing of the Crane and components on the vessel. 5. Vessel departure from Fabrication Site.
6	10%	1. Safe arrival and offload of Crane at the Erection Site. 2. Delivery of spare spreader 2. Full mobilization by the Contractor's personnel and Louisiana licensed erection sub-contractor at the Erection Site. 3. Board acceptance of the Contractors erection, testing, & commissioning daily project schedule.
7	10%	1. Completion of final erection of the Crane. 2. Start of Performance and Acceptance Testing
8	10%	1. Successful completion of all items in the Erection Site Test & Checkout Manual 2. Contractor agreement to punchlist items remaining 3. Delivery of all spare parts 4. Completion of training 5. Contractor receipt/acceptance of Substantial Completion Certificate
9	10%	1. Completion of all remaining punchlist items 2. Delivery of all required documentation 3. Contractor receipt/acceptance of Final Acceptance Certificate

(v) - Upon due notice from Contractor of presumptive completion of the entire project, or a specified portion of the project, Engineer will make an inspection. If all construction provided for and contemplated by this Contract is found to be SUBSTANTIALLY COMPLETE to his satisfaction, Engineer shall issue a CERTIFICATE OF SUBSTANTIAL COMPLETION. ("Substantial Completion" is defined as the construction being sufficiently complete in accordance with the Contract Documents, so that the project or a specified portion of the project can be utilized for the purposes for which is was intended). Should this inspection disclose items which are not complete or which require corrections, Engineer shall prepare a list of these items and the estimated cost of completion of the items, which shall be attached to the Certificate of Substantial Completion. These items must be completed within the time specified in the Certificate of Substantial Completion. After these items are completed, another inspection will be made. If necessary additional inspections will be made until all items are complete to the satisfaction of the Engineer.

(vi) - Within fourteen (14) days of the date of substantial completion the Board will issue a formal notice of ACCEPTANCE OF COMPLETED CONTRACT prepared by the Board for the Contractor to record with the Recorder of Mortgages of the Parish in which the work has been done. Not less than forty-five (45) days after the recondition of this Acceptance of Completed Contract, the

Contractor shall furnish to the Engineer a LIEN AND PRIVILEGE CERTIFICATE issued by the said Recorder of Mortgages certifying that there are no outstanding claims or liens recorded against this project. Upon receipt of the clear Lien and Privilege Certificate and an invoice marked FINAL from the Contractor for the entire balance due including retainage, all prior certificates or estimates upon which payments have been made being approximate only and subject to correction on the final payment, the Contractor shall be paid in full after Engineer is satisfied all quantities shown on final estimate are correct.

(vii) - Whenever the Unit Price Form is utilized, payments will be made as specified in paragraph (iv) above, except that the unit prices shown on the Unit Price Form that was submitted with the Louisiana Uniform Public Work Bid Form will be used by Engineer in the preparation of his estimates for payments."

(viii) - It is expressly stipulated and understood that payment of the full contract amount shall not operate to release Contractor or his Surety from liability for any and all fraud in construction, or in obtaining progress payments, or in payment for materials, labor or other supplies or services incidental to the work, or for any and all claims for damages, loss or injury sustained by any person or persons whomsoever, through the fault, negligence or conduct of said Contractor, his employees, agents or subcontractors.

(ix) - On projects in which parts of the work are turned over to Board for permanent use prior to completion of the contract as a whole, pursuant to GENERAL CONDITIONS - ARTICLE 25, upon written request of Contractor Board may pay all or part of the retained amount, with respect to such portions of the work for which certificate of completion has been given, the amount of such payment to be determined by Engineer; provided that Contractor shall submit to Engineer acceptable evidence that all invoices for materials and all payments due subcontractors have been paid up to that time.

ARTICLE 45 - MOBILIZATION

This work consists of preparatory work and operations, including those necessary for movement of personnel, equipment, supplies and incidentals to the project site; the establishment of offices, buildings and other facilities necessary for work on the project; the cost of bonds and any required insurance; and other preconstruction expenses necessary for start of the work, excluding the cost of construction materials.

Payment for this work shall be as follows:

(a) No direct payment will be made for mobilization, unless supplemental mobilization/demobilization is shown on a Unit Price Form that accompanies the Louisiana Uniform Public Work Bid Form.

(b) When the contract contains a unit price item for supplemental mobilization/demobilization, payment will be made at the price

shown on the Unit Price Form that accompanies the Louisiana Uniform Public Work Bid Form, subject to the following provisions:

Partial payments for mobilization will be made in accordance with the following schedule up to a maximum of 10 percent of the original total contract amount, including this item. Payment of any remaining amount will be made upon completion of all work under the contract.

Percent of Total Contract Amount Earned	Allowable Percent of the Lump Sum Price for the Item
1st Partial Estimate	25
10	50
25	75
50	100

No payment adjustments will be made for this item due to changes in the work in accordance with GENERAL CONDITIONS - ARTICLE 19.

ARTICLE 46 – MINORITY, WOMEN, AND DISADVANTAGED BUSINESSES AND MONTHLY REPORT SAMPLE

The Board adheres to the bid laws and procurement regulations of the State of Louisiana. In that spirit, the Board strongly encourages maximum participation in all bids by certified and qualified minority, women and disadvantaged business enterprises as prime contractors and subcontractors, construction-related service providers, and construction materials suppliers. While the Board does not endorse or approve the technical or commercial qualifications of minority, women or disadvantaged contractors, subcontractors, construction-related service providers, or construction materials suppliers, the Board encourages Contractor to solicit bids from them for work on the project, and, toward that end, the Board refers Contractor to the Board's minority and women owned business consultant, Riverworks, which can be reached at 504-896-4600, for assistance.

After award of the contract, the Contractor may be requested to submit to Board (1) a plan for use of certified minority, women or disadvantaged subcontractors, construction-related service providers, and construction materials suppliers by task/function and the estimated dollar value for each; and (2) a list of certified minority, women or disadvantaged subcontractors, construction-related service providers, and construction materials suppliers contacted and considered for this project. To the extent not inconsistent with applicable state and federal laws, the Board will accept the certification of such status by any public body having jurisdiction to do so, e.g., the federal or state government, including the SBA or some similar authorizing agency. Furthermore, Contractor may be requested to submit written monthly reports on utilization of such firms. See attached sample report.

ARTICLE 47 – APPLICABLE LAW

This is a Louisiana contract which shall be subject to, governed by, and interpreted pursuant to the laws of the State of Louisiana without regard to applicable conflict of laws principles. The parties hereby consent and agree to submit any dispute which may arise under the contract to Louisiana courts of competent jurisdiction and venue.

SPECIAL CONDITIONS OF THE CONTRACT

The following Special Conditions supplement the General Conditions (given under the preceding Articles 1 through 47, inclusive) with special reference to the contract covered by the attached specifications.

SPECIAL CONDITIONS

ARTICLE 1 - TAXES

To the extent that work is performed or materials purchased in Louisiana, Contractor shall not include in his bid any state and local sales or use tax on materials, supplies, and equipment which are purchased to be affixed, incorporated into or otherwise made a permanent part of the completed Work as well as other taxable services, leases and rentals of tangible personal property used in the completion of the Contract (hereafter referred to as "Applicable Materials and Services").

All purchases of Applicable Materials and Services shall be made by Contractor in its designated capacity as Agent for and on behalf of Board. Board shall provide to Contractor a copy of the Department of Revenue & Taxation Form R-1020 ("Designation of Construction Contractor as Agent of Government Entity") at the time of the Notice to Proceed after award of the Contract. Contractor shall submit this form to the Department of Revenue and Taxation for the purpose of obtaining a Certificate of Sales Use Tax Exemption/Exclusion. Contractor shall present to vendors and suppliers of Applicable Materials and Services a copy of the Department of Revenue and Taxation Form R-1056 ("Certificate of Sales Use Tax Exemption/Exclusion") when purchasing Applicable Materials and Services for the project.

The designation of Contractor by Board as its agent in accordance with LAC 61:I4301 is for the limited purpose of purchasing Applicable Materials and Services in furtherance and performance of the Work specified in the Contract and is not intended nor should it be construed as a designation of Contractor as agent for any other purpose.

All Applicable Materials purchased by Contractor as Board's agent exclusively for the project specified in this Contract, but not actually used, shall belong to and become the property of Board. All whole, unused Applicable Materials not incorporated into the Work shall be picked up by Board at its expense on notification by Contractor. When the said Applicable Materials are turned over to Board, Contractor shall provide to Board a certified list of items being transmitted to Board. All rights and warranties with respect to the Applicable Materials shall inure to the benefit of Board.

Nothing in this Article nor in any other article of these specifications is intended nor should be construed to alter, amend, or otherwise revise the responsibilities of Contractor, whether express or implied herein, to:

(a) fully insure the Applicable Materials to be used on the project or stored on or off site of the project;
(b) insure the progress of the project prior to Final Acceptance in accordance with the provisions of SPECIAL CONDITIONS - ARTICLE 2 ("Insurance");
(c) warrant the Applicable Materials furnished under the Contract;
(d) indemnify the Board in accordance with the

provisions of GENERAL CONDITIONS - ARTICLE 27 (“Indemnity”);

(e) alter, amend, or otherwise revise the method of payment as provided in GENERAL CONDITIONS - ARTICLES 42 “Payments”), 43 (“Extra Work”), and 44 (“Payments & Acceptance”);

(f) alter, amend, or otherwise revise the right of Board to accept or reject any of the Work during the progress of the project or to make or have made inspections of the Work as it progresses in accordance with provisions of GENERAL CONDITIONS - Article 15 (“Inspections”);

(g) provide for the safety, protection, and security of the Applicable Materials throughout the progress of the project in accordance with the provisions of SPECIAL CONDITIONS - ARTICLE 2 (“Insurance”);

(h) furnish and maintain liability and property insurance coverage for damage, loss or destruction of the Applicable Materials until Final Acceptance in accordance with the provisions of SPECIAL CONDITIONS - ARTICLE 2 (“Insurance”); and

(i) remit to the pertinent taxing authority any taxes other than sales and use tax that may be applicable to the project for which Board or Contractor as Board’s agent do not enjoy a legitimate exemption or exclusion.

Nothing herein shall be construed to relieve Contractor or any subcontractor from the payment of any sales, use or other taxes with respect to purchases of material, supplies or equipment which are not to be incorporated into the Work or used solely in the fulfillment of the obligations to be performed under this Contract, provided Contractor has complied with the terms of this Contract and all applicable laws and procedures.

In the event that Contractor is subject to a sales or use tax audit by either the State of Louisiana or a local taxing authority, and the taxing authority assesses taxes on any Applicable Materials and Services, Board agrees to defend its tax-exempt status as a political subdivision and the Contractor as its agent. Should the taxing authority prevail in imposing sales or use taxes on any purchases of Applicable Materials and Services, Board agrees to reimburse Contractor for those taxes or to pay the taxes directly to the taxing authority, but only to the extent that Contractor has complied with the terms of this Contract and all applicable laws and procedures.

SPECIAL CONDITIONS

ARTICLE 1.1 – EFFECT OF ARTICLE 1 THROUGHOUT THIS CONTRACT

The addition of SPECIAL CONDITIONS - ARTICLE 1 as amended above with regard to the exemption of Contractor as Board's agent from the payment of sales and use taxes for the Applicable Materials and Services as defined above is meant to alter, amend, and revise any provision contrary to the amended SPECIAL CONDITIONS - ARTICLE 1 which may appear elsewhere in this Contract, whether in the General or Special Conditions, with regard to the payment of sales and use taxes. Therefore, wherever throughout this Contract there is any mention of liability for the payment of sales and use taxes for Applicable Materials and Services which conflicts with the provisions of the amended SPECIAL CONDITIONS - ARTICLE 1, the terms of SPECIAL CONDITIONS - ARTICLE 1 as stated herein shall control as if they were repeated each time.

SPECIAL CONDITIONS

ARTICLE 2 - INSURANCE REQUIREMENTS FOR CONTRACTORS

1. **General Insurance Requirements**

   a. **Insurance Companies:** All insurance shall be written with insurance companies authorized and licensed to do business in the State of Louisiana and acceptable to the Board (Best's rating A-, VI, or better). Self-insurance programs authorized by the Commissioner of Insurance of the State of Louisiana for workers' compensation insurance are acceptable with the submission of a notarized copy of the contractor's authority to self insure.

   b. **Primary Insurance:** All insurance required herein shall be primary to any similar insurance that may be carried by the Board for its own protection.

   c. **Insurance Certificates:** Before this contract becomes effective, Contractor shall furnish to the Board's risk manager **original, manually signed** certificates evidencing that it has procured the insurance herein required. Current insurance certificates must be provided for the coverages required herein during the entire term of this agreement.

   d. **Named Insured:** Except for the workers' compensation insurance and the professional liability insurance, the Board shall be named as an additional insured on all policies required herein. In those instances where the Contractor is to do work on a site the Board leases to a tenant, Contractor shall have the tenant named as an additional insured on Contractor’s CGL policy. Contractor shall inquire of the Board which tenant is to be so named, if the Board has not notified the Contractor.

   e. **Waiver of Subrogation:** All insurance policies required herein, as well as any other insurance carried by the Contractor for its protection or the protection of its property on the contract, shall provide that the insurers waive any rights of subrogation in favor of the Board.

   f. **Notice of Cancellation:** All policies required herein shall provide for **thirty (30)** days written notice of cancellation or material change to be sent to the Board at P.O. Box 60046, New Orleans, LA 70160, Attention: Risk Manager.

   g. **Maintaining Insurance:** All insurance policies herein required shall remain in full force and effect for the duration of the contract. If any insurance required herein is canceled or materially changed and not immediately replaced during the term of this contract the Board reserves the right to purchase insurance at the expense of the Contractor to protect the Board's interest. The furnishing of insurance shall not relieve the Contractor of the responsibility for losses not covered by insurance.

   h. **No Representation or Warranty:** The Board makes no representation or

warranty that the insurance set forth in this Section will be sufficient to protect the Contractor's interests.

i. **Deductibles:** The contractor shall be responsible for the full amount of any deductible associated with any of the insurance policies required herein.

2. **Comprehensive General Liability Insurance** - Contractor shall procure and maintain at Contractor's sole cost and expense comprehensive general liability insurance **(on an occurrence basis)** with limit of liability of not less than five million dollars ($5,000,000) for all injuries or deaths resulting to any one person or from any one occurrence. The aggregate limit for products and completed operations shall be not less than five million dollars ($5,000,000). The limit of liability for property damage shall be not less than five million dollars ($5,000,000) for each occurrence and aggregate. Coverage under such insurance shall also include damage hazards. This insurance shall include coverage for explosion, collapse and underground property damage hazards, completed operations and Abroad form contractual endorsement. Where contractor's operations include the use of water craft, the water craft exclusion in the comprehensive general liability policy shall be eliminated. A combination of primary and excess liability insurance may be used to satisfy the conditions of this paragraph.

3. **Comprehensive Motor Vehicle Liability Insurance** - Contractor shall procure and maintain at contractor's sole cost and expense comprehensive motor vehicle liability insurance which **shall include hired car and non-ownership coverage** with limit of liability of not less than two million dollars ($2,000,000) for all injuries or deaths resulting to any one person or from any one occurrence. The limit of liability for property damage shall be not less than two million dollars ($2,000,000) for each occurrence and aggregate.

4. **Workers' Compensation Insurance** - Contractor shall procure and maintain at Contractor's sole cost and expense workers' compensation insurance which will protect Contractor from claims under the Louisiana Workers' Compensation Act (LSA 23:1021, et. seq.). If Contractor's employees qualify for compensation benefits under the provisions of the federal Longshoremen's and Harbor Workers' Compensation Act (33 USC 901, et. seq.), Contractor shall also procure and maintain insurance which will protect Contractor from claims under the LHWCA. The limits of liability under the employer's liability section of the workers' compensation policy, as well as both compensation schemes, shall be not less than one million dollars ($1,000,000). If Contractor's employees qualify for compensation benefits for injury or death under the provisions of the Jones Act (46 USC 688, et. seq.) and under the general maritime law, Contractor shall also procure and maintain insurance to cover such claims with a limit of not less than one million dollars ($1,000,000).

5. **Railroad Protective Insurance** (Not Used)

6. **Builder's Risk** - Contractor shall procure and maintain at Contractor's sole cost and expense builder's risk insurance which shall be the all risks type and shall protect Contractor and Board against all risks of damage to structures, materials, equipment, and buildings, excluding damages due to flood and earthquake. The amount of such insurance shall be not less than the value of the Work at completion. Such insurance shall be issued

subject to a deductible not to exceed ten thousand dollars ($10,000) which will be for the account of the Contractor.

Builder's risk insurance shall provide for losses to be payable to Contractor and Board as their interest may appear. The policy shall contain a provision that in the event of payment for any loss under the coverage provided, the insurance company shall have no rights of recovery against Contractor and the Board.

7. **Insurance to Protect the Cranes in Transit** – If the Cranes are delivered via marine transport, Contractor shall maintain marine cargo insurance covering the Cranes. If the Cranes are delivered by any other means (e.g., rail, truck, etc.) in addition to or in lieu of marine transport, then Contractor shall maintain such insurance as appropriate to cover the Cranes while in transit by these means. All such policies shall name the Board as additional insured and loss payee as the Board's interests may appear. All such coverage shall be written with insurers having an A.M. Best's rating of at least A-, VI, and, for marine cargo insurance, shall include ondeck and underdeck new and used shipment for "all risks" perils, including, but not limited to loading and unloading, control of damaged goods, removal of wreck, war risks, and strikes, riots and civil commotion. Insured value shall not be less than 100% of the Contract price, and any deductible shall be not greater than $100,000. Contractor shall be liable for any deductible it maintains.

   Contractor and/or its subcontractors shall maintain an "all risk" Installation Floater including coverage for loading and unloading, assembling and disassembling, and temporary storing of the Cranes under this Contract.

SPECIAL CONDITIONS

ARTICLE 3 – CONTRACT TIME AND REQUIRED COORDINATION OF WORK

(a) General

The Mississippi River Intermodal Terminal will be under construction by a Terminal Yard Contractor, Hard Rock Construction, LLC, at the time of delivery of the Cranes. Refer to SPECIAL CONDITIONS - ARTICLE 4 (a) regarding coordination of activities between the Contractor and the Board's Terminal Yard Contractor.

It is the responsibility of the Contractor to coordinate his work to minimize the inconvenience to the Board's tenant working adjacent to the Contractor's work areas.

(b) Coordinate of Work

Contractor shall confine his operations to within the limits of work shown on the Drawings for the RTG Erection Area and RTG Testing Area and he shall restrict his operations to the least amount of area necessary to perform the work so as to reduce disruption of the tenants operations.

The Contractor shall coordinate his work, well in advance of any construction, with the Engineer and the tenant.

(c) Contract Time

In accordance with the terms of the specifications and the general and special conditions of the contract documents, especially SPECIAL CONDITIONS - ARTICLE 4, paragraph (f) and GENERAL CONDITIONS - ARTICLE 5, the Contractor shall begin work within ten (10) calendar days after date set forth in Notice to Proceed from the Board, and to provide the Cranes on the Erection Site for final assembly on or after December 1, 2015 and complete all work by January 29, 2016, subject to the assessment of ascertained and liquidated damages of two thousand dollars ($2,000.00) per calendar day of delay per Crane.

Delays due to failure of Contractor to provide sufficient personnel that are TWIC card holders or Port of New Orleans approved TWIC card escorts, will not excuse the Contractor from being assessed liquidated damages per calendar day beyond the contract time. The Notice to Proceed will not be delayed to accommodate the Contractor, its sub-contractors, and suppliers obtaining TWIC cards or TWIC card escorts to access the Erection Site.

SPECIFICATIONS
FOR
MISSISSIPPI RIVER INTERMODAL TERMINAL
ELECTRIC RUBBER TIRE GANTRY CRANE PROCUREMENT

SPECIAL CONDITIONS
ARTICLE 4 - GENERAL SPECIFICATIONS

(a) Extent of Entire Project

The work consists of furnishing all labor, material and equipment for the design, engineering, manufacture, delivery, assembly, testing, and training for two electric rubber tire gantry cranes (E-RTG Cranes or Crane(s)) to be placed into service at the Mississippi River Intermodal Terminal site (Erection Site), together with all required miscellaneous and incidental work.

Adjacent construction (site infrastructure and railroad track installation) will be in progress during this project by a Terminal Yard Contractor. See Drawings for location. The Terminal Yard Contractor will provide the RTG Erection Area and RTG Testing Area as shown on the Drawings in a substantially complete condition to the Contractor. It is anticipated that the Cranes will be assembled on the Erection Site and the RTG Erection Area will be provided for this purpose. Once the Cranes and all associated equipment are on the Erection Site to begin final assembly, the Contractor shall barricade the area he uses in the RTG Erection Area with jersey barriers, cones, barrels, warning tape, etc., to delineate and segregate the erection space. The RTG Testing Area will be provided for the testing and commissioning of the Cranes. The Contractor shall have free and clear use of the RTG Erection Area and/or RTG Testing Area. The Terminal Yard Contractor shall not encroach on or interfere with the Contractor's RTG Erection Area or RTG Testing Area during final assembly or testing of Cranes. The Contractor shall coordinate with the Terminal Yard Contractor regarding access to/from RTG Erection Area and RTG Testing Area through the Terminal Yard Contractor's entrance. Any Contractor access required to the terminal outside of the Terminal Yard Contractor's site must be coordinated with the tenant, New Orleans Terminal (N.O.T.).

The Contractor shall schedule and conduct his operations in such a manner as to cause the least possible inconvenience to tenants and the Terminal Yard Contractor, thereby permitting the Board and the Board's tenants to conduct their operations in a satisfactory manner throughout the contract period.

The Contractor shall anticipate that the permanent electric feed may not be available at the time of preliminary testing. The Contractor shall coordinate with Entergy of New Orleans, the local utility provide, to provide a temporary service

It is expected that the Cranes and associated equipment will arrive on the Erection Site by December 1, 2015 and be fully operational by January 29, 2016.

(b) General Requirements

The Contractor shall furnish any and all work and materials incidental to the

items listed above and as may be indicated on the drawings or in these specifications as necessary to complete the project in full compliance with the Contract Documents.

In general, the work under this Contract consists of furnishing all materials and labor, and performing all work required (except as otherwise provided in SPECIAL CONDITIONS - ARTICLE 4 (d)) for completing the work shown on the drawings and called for in these Contract Documents. The work essentially consists of but is not limited to the following:

1. Design, Engineering, Manufacture, Delivery, Assembly, Testing and Training for two (2) E-RTG cranes at the Mississippi River Intermodal Terminal at the Napoleon Avenue Terminal Complex New Orleans, Louisiana, USA.

In addition to the work and material listed above, Contractor shall furnish any and all work and material incidental to the items listed above and as may be indicated on the drawings or in these Specifications as necessary to complete the project in full compliance with the Contract Documents.

Contractor shall accept the Erection Site as found at commencement of work in that area, and he shall verify the scope of all work and all dimensions and details in the field and report any discrepancies noted to the Engineer.

All work shall be done as described in the Specifications and shown on the drawings, and in strict accordance therewith, to the satisfaction of the Engineer.

The Contractor shall lay out all work, check overall dimensions against intermediate dimensions, check and verify existing measurements and refer discrepancies, if any, to the Engineer for direction.

The Contractor shall install, maintain and remove all construction equipment and auxiliary devices, and shall be responsible for the safe, proper, and lawful maintenance of same. The Contractor will be held responsible for any loss of materials on the site or incorporated in the construction and site including vandalism, theft and malicious mischief within his limits of work as indicated on the Contract drawings. Any losses involved, damages, etc. occurring shall be replaced or restitution made agreeable to the Board, as the case may be, at no cost to the Board, until completion and acceptance of the work.

The Construction Industry, OSHA Safety and Health Standards (29) CFRR 1926/1920), U.S. Department of Labor, Occupational Safety and Health Administration Revised 1987 publication OSHA 2207 shall be made part of these specifications and contract requirements.

(c) Board's Drawings and Specifications

Copies of data furnished by Board or Engineer to Contractor or Contractor to Board or Engineer that may be relied upon are limited to the printed copies (also known as hard copies). Files in electronic media format of text, data, graphics, or other types are furnished only for the convenience of the receiving party. Any conclusion or

information obtained or derived from such electronic files will be at the user's sole risk. If there is a discrepancy between the electronic files and the hard copies, the hard copies govern.

Because data stored in electronic media format can deteriorate or be modified inadvertently or otherwise without authorization of the data's creator, the party receiving electronic files agrees that it will perform acceptance tests or procedures within 60 days, after which the receiving party shall be deemed to have accepted the data thus transferred. Any errors detected within the 60-day acceptance period will be corrected by the transferring party.

When transferring documents in electronic media format, the transferring party makes no representations as to long term compatibility, usability, or readability of documents resulting from the use of software application packages, operating systems, or computer hardware differing from those used by the data's creator.

Accompanying these Specifications, and forming an integral part thereof, are the Board's drawings which numbers are listed in the "Table of Contents."

(c-1) Submittals

Whenever work is to be fabricated and/or machined specifically for this Contract, the Contractor shall submit, for approval, final shop and erection drawings, manufacturer's drawings, catalogue cuts and/or literature covering products (equipment, fixtures, devices, etc.) to be furnished or for items of work for which submittals are required in the technical Specifications, all as soon as possible. These are to be delivered to the Board of Commissioners of the Port of New Orleans, Engineering Dept., 1350 Port of New Orleans Place, P.O. Box 60046, New Orleans, Louisiana 70160, Attention: Engineering Director. The checking and approval as to overall conformity with the contract document will not be considered to waive any of the provisions of these contract documents and shall not release the Contractor from responsibility for the corrections of his submittals nor for errors in details which may interfere with erection. All submittals transmitted for approval shall be in strict conformity thereto as provided for under "Request for Alterations or Substitutions." Prior to transmittal, all submittals must be thoroughly checked by Contractor to insure this conformity. In addition, the Contractor must be certain that any equipment he proposes to furnish and/or install will fit and functionally operate within the designated available space. Clearances shall be functional and as specified. Each submittal shall have Contractor's signed statement that the above requirements have been met and that he approves it for submission, such as "Reviewed and approved by XYZ Construction."

Whenever required in the technical Specifications, the originator of the shop drawings or data shall certify compliance with the Contract Documents except for deviations specifically identified as a variation and noted clearly on the submittal.

If the Contractor fails to comply with the requirements of SPECIAL CONDITIONS - Article 4 (c-1), the Engineer will not review the submittal and it will be returned stamped "NOT ACCEPTED FOR REVIEW."

Submittals not required by the Contract Documents will not be reviewed and will

be returned stamped "NOT APPLICABLE."

Such submittals, properly checked before submission, shall be delivered to the Board in a timely manner to allow review by the Board prior to ordering or fabrication. These submittals are to be requested within the time stated in Subsection c-2 and will be reviewed by the Board within fourteen (14) calendar days, not including Board holidays, after receipt. After Board's review the Contractor shall pick up submittals from the Board. Submittal and checking time is included in total time for completion of work.

Submittals/shop drawings reviewed by the Engineer shall be returned stamped with one of the following:

1. CONFORMS WITH CONCEPT

   The Engineer's review found no objectionable deviations and it conforms with the design concept.

2. CONFORMS WITH CONCEPT AS NOTED

   The Engineer's review found no major deviations from the contract requirements. Minor discrepancies or deficiencies were noted onto the drawing or submittal. Corrected copies are not required for re-submittal, however the item is to be furnished in accordance with the Engineer's notes. If the contractor, supplier, or manufacturer takes exception to any of the Engineer's comments, then corrected or supplemental data is to be re-submitted.

3. REVISE AND RESUBMIT

   The Engineer found major discrepancies or deficiencies such that the submittal/shop drawing must be corrected to comply with the Contract Documents and re-submitted.

4. NOT ACCEPTED

   It is the Engineer's opinion that the item submitted does not meet the Contract Document requirements. The correct data must be re-submitted.

The Engineer's review is to determine if the shop drawing, catalog brochure, letter, etc., conforms to the design concept and the requirements of the Contract Documents. Design concept relates to the final, in-place installation of material and equipment as part of a functioning whole project as required by the Contract Documents.

Time lost because of submission by Contractor of incorrect or incomplete submittals will not be cause for extension of specified contract period.

The Contractor shall follow up requests for approval, if not acknowledged within the time designated above, to avoid loss of submittals in mail or in handling.

The Contractor shall furnish at least six (6) complete sets of check prints plus the number of additional copies over two (2) required for return to Contractor; four (4) of these copies will be retained for use by the Board and the others returned. The Contractor shall furnish, for Board use, four (4) sets of prints of all final drawings, plus one or more sets of prints for return to Contractor after approval.

The Contractor, at his option, may elect to submit one (1) reproducible drawing and two (2) check prints, in which case, one (1) marked-up reproducible will be returned to the Contractor for his duplication.

Where manufacturer's drawings or catalogue cuts are required, the quantities required shall be the same as above. Two (2) of these MUST BE PRINTED ORIGINALS which will be kept by the Board for its records. Those submittals which do not contain two (2) originals will not be accepted.

All catalogue cuts, brochures or other literature submitted shall be manufacturer's latest issue in current use.

All information on all submittals must be clearly legible. Those submittals which are not clearly legible will not be accepted. Any variations from the Contract Documents made by the supplier, manufacturer or Contractor shall be clearly identified.

As far as practical, drawings shall be submitted in installments as to avoid any unnecessary concentration of checking by Board.

When submission of manufacturer's catalogue cuts or brochures is required to described items of equipment to be furnished by Contractor, each brochure shall include manufacturer's name, catalogue number and dimensions, and shall indicate all modifications to standard equipment. Each piece of literature shall be clearly marked to indicate the specific type or catalogue number of the item to be supplied, and the location and application for which it is intended, for example: "limit switch No. 000XYZ, upper travel limit for overhead rolling door, Bay No. 42." All such submittals shall bear the title of the project, in the case of shop and erection drawings, each shall additionally bear an appropriate drawing number.

If the submittal data is bound in a folder, the outside of the folder shall be clearly marked with the name of the job, otherwise each individual sheet must carry this identification.

Each submittal package presented for review must be accompanied by an itemized list of all items submitted.

All manufacturers' literature as well as Contractor's shop and erection drawings, as above specified, which are submitted without proper marking and identification, will not be reviewed by the Board, but will be returned for proper marking as required.

Whenever Contractor's drawings and/or catalogue cuts are returned to him marked other than "Conforms with Concept" or "Conforms with Concept as Noted," he shall correct these documents and resubmit for final review and distribution. No product shall be purchased or work fabricated until final corrected submittals, shop drawings and/or catalogue cuts are reviewed by Board and returned to Contractor marked

"Conforms with Concept" or "Conforms with Concept as Noted."

Within ten (10) days after substantial completion of the work, the Contractor shall furnish the Board, at contractor's expense, one complete set of vellum reproducibles of all final shop and erection drawings. Vellum shall be of quality acceptable to Board. No part of the retainage due Contractor will be paid until all such vellum reproducibles have been furnished, and accepted by the Board.

SUBMITTAL SCHEDULE

At the time the construction schedule is submitted, a schedule shall be submitted of the items of materials and equipment for which submittals are required by the specifications.

For each required submittal, the date shall be given for intended submission of the submittal to Engineer for review and the date required for its return to avoid delay in any activity beyond the scheduled start date. Sufficient time shall be allowed for initial review, correction and resubmission, and final review of all submittals. In no case will a schedule be acceptable which allows less than fourteen (14) calendar days, not including Board holidays, for each review by Engineer.

MAINTENANCE AND OPERATION MANUALS AND AS-BUILT DRAWINGS

Within ten (10) days after substantial completion, the Contractor shall submit two copies of all maintenance and/or operation manuals, installation drawings, instructions, calibration manuals and assembly instructions received or used for this contract.

The Contractor shall be responsible for keeping accurate records and up to date “as-built” drawings of any additions or modifications to the original Contract Drawings. These “as-built” drawings shall be available for viewing on the site at all times and shall be reviewed by the Engineer at the monthly progress meetings.

In addition the Contractor shall submit one (1) set of “as built” drawings marked in red showing all significant deviation from the drawings, including changes in material, location, size, quantity, etc. Dimensions shall be given for underground runs and hidden installations. All “as-built” drawings shall be approved by the Engineer. Final payment shall not be issued until all “as-built” drawings are completely submitted and approved by the Port.

<u>(c-2) Requests for Alterations or Substitutions</u>

Should the Contractor desire to make alterations or substitutions during the contract period of any nature whatsoever, he shall formally request approval of the same, in writing, from the Board. Such approval of a change or substitution will only be valid when issued to the Contractor, in writing, over the signature of the Manager of Construction Services.

The Contract, if awarded, will be on the basis of materials and equipment described in the Drawings or specified in the Specifications without consideration of possible substitute or “or approved equal” items. Whenever it is indicated in the

Drawings or specified in the Specifications that a substitute or “or approved equal” item of material or equipment may be furnished or used by the Contractor if acceptable to Engineer, application for such acceptance shall be submitted for prior approval no later than seven working days before the date of the bid opening, set out in accordance with the procedure set out in Article 11 of the General Conditions.

(d) Furnished by the Board

Either with its own forces or otherwise, the Board will provide the following items for this project:

1. Engineering services to the extent stated in GENERAL CONDITIONS - ARTICLE 37 and testing laboratory services as stated in paragraph (e-1).

2. Board's facilities to the extent stated in SPECIAL CONDITIONS - ARTICLE 4 (g).

3. Space, if available, near the project area for storage of Contractor's tools and equipment but without responsibility of part of the Board for security thereof.

The Contractor shall pay for damage caused by his forces to structures, materials delivered to him, or to trucks or equipment, which are property of the Board or others, or which might be used in providing the above mentioned work, services or materials.

Well in advance of time needed, the Contractor shall make requests to the Engineer or responsible representative for delivery of materials or services to be furnished as above.

(e) Furnished by the Contractor

The items of labor, materials, or other details specifically mentioned in these specifications or the accompanying plans, or attached contract form, as being supplied by the Board, are the only items which the Board will furnish; and everything else required for a complete job under this contract shall be furnished by the Contractor at his expense.

Contractor will be required to meter and pay for water on Board property after making proper arrangements with the Board’s Maintenance Department. (See Section 1500).

(e-1) Materials Tests

The Board reserves the right to conduct tests of all materials for compliance with the specifications. These tests will be performed at the direction and under the general supervision of the Engineer. Whenever practicable, sampling of materials will be done at the project. If such tests show the materials do not meet specifications, the cost of the tests shall be at the Contractor’s expense and will be deducted from amounts due

the Contractor. The Board will assume the costs of tests ordered by the Engineer on materials found to meet the specified requirements.

All welds shall be subject to spot nondestructive testing by any method(s) which, in the judgment of the Board, may be required to establish the soundness of any and all welds in conjunction with this Article (e-1), and in accordance with the American Welding Society STRUCTURAL WELDING CODE AWS D1.1, Section 6, Inspection, and “STRUCTURAL WELDING CODE - REINFORCING STEEL” AWS D12.1.

The Contractor is obligated without extra cost to Board, to render all reasonable assistance needed at his plant or shop or at job site in connection with sampling and testing materials or products.

(f) Construction Program

Contractor shall proceed with the work under this contract within ten (10) calendar days after date set forth in Notice to Proceed and all work shall be completed within the time stipulated in **ARTICLE 4 - TIME LIMITS AND ORDER OF BEGINNING AND COMPLETION** and subject to assessment of ascertained and liquidated damaged as set forth in **ARTICLE 5 - ASCERTAINED AND LIQUIDATED DAMAGES** of the **GENERAL CONDITIONS** section of these contract documents.

Immediately after written date of notice to begin work under this contract, the Contractor shall line up his forces and equipment, do other preparatory work, and maintain the following work schedule:

1. Begin work within ten (10) calendar days after date set forth in Notice to Proceed and complete all work within the number of consecutive calendar days stipulated under BID OF CONTRACTOR, and subject to the ascertained and liquidated damages set forth therein.

If requested by the Engineer, the Contractor shall, within 15 consecutive calendar days after notice to begin work under this contract, or at such later date as may be determined by the Board, prepare and submit to the Board for approval, a construction schedule, showing the order in which the Contractor proposes to accomplish the work, the date on which he plans to start each of the various phases of construction (including procurement of materials and equipment) and the contemplated date on which he proposed to complete each such operation. The schedule shall be in the form of a progress chart suitable to indicate the percentage of work scheduled for completion at any time and the anticipated monthly progress payments. The Contractor shall further submit regular progress reports to the Board. A progress report shall be submitted for each calendar month or other suitable period as may be determined in advance by the Board. The actual progress attained during the period shall be entered on a copy of the progress chart and delivered to the Board within five (5) working days following the end of the period covered. All charts shall be submitted in triplicate. Progress shall be indicated as a percentage completed for each phase of construction scheduled, plus an overall percentage completed for the entire project. Charts shall be compiled in the form of "bar graphs" and "S" curves on appropriate sheets of such length and width as may be required to plot the graphs to a scale approved by the

Board. Immediately following award of contract the Board will furnish a sample copy of each required type of chart to the Contractor. Should the construction program be delayed, the Board may require a revised schedule, and same shall be provided within fifteen (15) consecutive calendar days after date of Board's request, by Contractor and at Contractor's expense. Should the Contractor fail to submit a construction schedule within the time herein prescribed the Board shall have the right to order all work on the project to cease until such time as an acceptable schedule is furnished, and without any extension of the contract period for time so lost. Failure to submit a progress report within the time herein prescribed will be cause for the Board to withhold approval of progress payment until such time as Contractor submits the required progress report. Consistent with the schedule, the Contractor shall inform the Board in advance, sufficiently in time to permit the Board to make proper arrangements, whenever services furnished by the Board, or inspections of materials are needed by the Contractor.

PROGRESS MEETINGS

If requested by the Engineer, Contractor shall schedule and hold regular progress meetings at least monthly and at other times as requested by Engineer or required by progress of the work at the RTG Erection Site. Contractor, Board Quality Control Engineer, Project Engineer, Field Project Representative, Contractor's Project Manager and Superintendent and all Subcontractors active on the site shall be represented at each meeting or required by the Engineer. Contractor may at his discretion request attendance by representatives of his suppliers, manufacturers, and other Subcontractors. Contractor shall be fined $250 if his Project Manager or Superintendent of Record fails to attend a scheduled progress meeting. Fines shall be deducted from the progress payments.

Contractor shall preside at the meetings and provide for keeping and distribution of the minutes. The purpose of the meetings will be to review the progress of the work, maintain coordination of efforts, discuss changes in scheduling, submittal data, anticipated work, pay requests, etc. and resolve other problems which may develop.

Time will not be extended because of inclement weather ordinarily liable to occur during the contract period, or regularly established holidays, whether set by law or labor rules. Forces employed and rate of progress must be sufficient for the work as scheduled, and to compensate for usual non-working hours. If work lags, sufficiently increased forces and hours shall be used to maintain the schedule.

Throughout the progress of the job, Contractor shall provide sufficient materials, labor, tools and equipment needed to carry on the various types of work required in proper sequence and in an orderly and efficient manner to complete all items of work as promptly and satisfactorily as possible.

The Board has established the following time to be lost "because of inclement weather ordinarily liable to occur during the contract period":

January	4 work days
February	4 work days
March	4 work days

April	2 work days
May	2 work days
June	5 work days
July	7 work days
August	7 work days
September	4 work days
October	0 work days
November	1 work days
December	4 work days
TOTAL	44 work days

From commencement of construction through final acceptance of the project, the Contractor shall provide a competent, qualified, experienced superintendent at the job site during all working hours.

Time extensions will be granted when inclement weather, as defined herein, prevents the Contractor from performing work (critical to the construction schedule at the time the adverse condition occurs) for more than the number of work days stipulated above.

The Contractor shall coordinate time and location of deliveries of material and equipment to the project site with the Engineer. The Contractor shall have his own representative receive all deliveries. The Contractor shall be fully responsible for all items delivered to the project site and shall provide, at his expense, all necessary protection and security for same.

(g) Construction Site

The site of the final assembly work is located in the vicinity of the Board's Mississippi River Intermodal Terminal in New Orleans, Louisiana, as shown on the "Vicinity Map" on the Board's drawing.

Bidders are encouraged to familiarize themselves with the project scope by attending the pre-bid meeting, reviewing the plans and specifications, and asking questions prior to bidding, and to investigate operations of the Board and others at the site, or in the vicinity, and conditions existing and liable to exist during the time of the work, and their possible effect on receipt and storage of materials, difficulties in performing the work and rate of progress. Operations of the Board or others shall not be interfered with or interrupted, except as herein stipulated or as may be necessary and only by previous arrangement with the Engineer.

In his use of the construction site described above, the Contractor will be responsible for the safety of his own equipment with reference to all hazards. All personnel who enter Board terminals in areas with cargo or construction activity, may be denied access if a hard hat and a safety vest is not worn.

The Contractor shall confine his Construction operation and shall use due care in placing construction tools, equipment, pipe materials and supplies, so as to cause no damage to property and interference with Port traffic. Materials may be stored only

within areas designated by Engineer. If materials are stored elsewhere, it shall be at the Contractor's risk, and if interfering with a tenant's operation, shall be relocated promptly without any cost to the Board. Continuous coordination between Contractor and Board's tenants shall be maintained and both shall cooperate fully in maintaining operations of both Contractor and tenants concurrently with as little interference and inconvenience as possible.

Contractor shall make his own arrangements for receiving his materials and shall assume full responsibility for security of all items stored at the work site, including equipment and tools. Contractor shall devise his own methods for access.

Contractor shall occupy an area only so long as is necessary, and shall remove all equipment, temporary construction, scrap material, litter and debris immediately when his use of that area is no longer needed.

The Contractor shall be responsible for receipt of his materials and protection thereof from theft or damage, as well as for his equipment, tools and other items.

The physical extension of all utilities, including electric power facilities and piping from present service locations to points of temporary consumption during construction, the removal of any and all additions or extensions so made, and restoration to its previous condition of any and all services into which a tie-in was made, shall be made by Contractor at his expense. Contractor shall make his own arrangements for such services. He shall be fully responsible for any and all bills incurred for utilities.

Damage done to structures or equipment of the Board or others shall be repaired by the Contractor at his cost, to the satisfaction of the Engineer.

Smoking and operations creating a fire or explosion hazard are prohibited, except in areas where specifically allowed, and only if adequate precautions, approved in advance by the Engineer, are taken.

Welding and burning on the project site will be permitted only under controlled conditions approved in advance by the Engineer. When required, non-combustible shields and manned fire hoses with water instantly available shall be provided. Contractor shall obtain a welding and burning permit from the U.S. Coast Guard and Harbor Police.

(h) Work on or Adjacent to Railroads - New Orleans Public Belt Railroad (NOPB)

The Contractor shall perform all work on and adjacent to the railroad in accordance with the requirements shown on the Contract Documents. During the progress of such work, the Contractor shall maintain liaison with the NOPB’s officers and representatives as may be designated by the NOPB. In the event the Contractor requires a crossing of the NOPB's right-of-way and tracks at other than a public crossing and outside the limits of work of this contract with its machinery or equipment incident to the contract, the Contractor shall first enter into an agreement satisfactory to the NOPB setting forth the terms and conditions with respect to the establishment, use, and removal of such crossing.

The Contractor shall, prior to progress inspections, clear the railroad tracks of any materials, earth, mud, rocks and other debris.

The Contractor shall keep all equipment, tools and materials stored at least ten (10) feet from the center line of any usable track.

Any cost for damage to NOPB, the Board or Illinois Central Railroad track and/or delays in service caused by the Contractor shall be borne by the Contractor. Any silting of track adjacent to Contractor's work areas which is caused by sand or other material blowing or draining into rails shall be hosed and/or swept clean by the Contractor before the end of the day at no cost to the Board or the railroad. Any cost for damage to trackage and/or delays in service caused by the Contractor shall be borne by the Contractor.

The Contractor shall send a copy of the construction schedule to New Orleans Public Belt Railroad at least one (1) week in advance of initiating on-site work to:

New Orleans Public Belt Railroad
Mr. Doug Campbell
Manger, Engineering and Maintenance
504-733-3120

It is essential that any temporary loss of track service be minimized and approved in advance by the NOPB and the Engineer.

As the work proceeds the Contractor will be required to advise the railroad verbally at least two (2) days in advance of any work near the railroad tracks and the day after they complete the work near the railroad tracks.

Contractor will be required to have railroad flagmen (lookouts) should his work be within four feet of the nearest rail and abide by Railroad’s work on track, Railway worker protection rule as per FRA requirements.

The Contractor shall perform all work adjacent to the railroad so as not to interrupt or delay the operation of trains over the tracks in use, or upon said premises except under arrangements between the Contractor and the NOPB. During the progress of such work, the Contractor shall maintain liaison with the NOPB’s officers and representatives as may be designated by the NOPB so as to ascertain the time of passage of trains at the site of the work, and to clear the railroad tracks and facilities of men, equipment and obstructions to permit free flow of railroad traffic. In the event the Contractor requires a crossing of the NOPB’s right-of-way and tracks at other than a public crossing and outside the limits of work of the contract with its machinery or equipment incident to the contract, the Contractor shall first enter into an agreement satisfactory to the NOPB setting forth the terms and conditions.

The Contractor shall, at all times during period of construction, keep the railroad tracks and roadbed free of material, earth, mud rocks and other debris. Any damages caused by Contractor’s operations shall be restored to NOPB’s satisfaction at

Contractor's sole cost.

The Contractor shall be advised that throughout this entire project the work shall be in close proximity to the NOPB.

If the Engineer of NOPB. deems their tracks are unsafe due to construction debris and equipment unnecessarily on or adjacent to track, then they will require watchmen or flagging services by railroad personnel and for the account of the Contractor. This cost is approximately $318.00/ day per man or $39.75/hour per man.

There is no pay item from the Board to the Contractor for this service since it is considered by the Board that this comes under the Contractor's area of responsibility and control. Contractor shall pay New Orleans Public Belt railroad directly for watchmen or flagmen with no compensation from the Board.

(i) Prevention of Environmental Pollution

Direct or indirect discharge of contaminants* into the Mississippi River, the Inner Harbor-Navigation Canal or the Mississippi River-Gulf Outlet is strictly prohibited by law. Board's Contractor(s) and, if any, respective Sub-Contractor(s) (all hereinafter referred to collectively as "Contractor") shall be held responsible for any and all such discharges or pollution of the foregoing mentioned navigable waters resulting from contract work performed under this contract. Should a contaminant be discharged to any or all of the foregoing navigable waters, thereby bypassing proper and legal disposal procedures, then immediate remedial action is required on the part of the responsible Contractor, at his cost, risk and expense, to recover and properly and legally dispose of any and all such material(s) constituting the condition of pollution. Contractor must promptly inform Board concerning all such discharge or release of contaminants.

*The word "contaminants," as used in this SPECIAL CONDITIONS - ARTICLE 4, refers particularly to such petroleum products commonly identified as oil and grease, but is not limited to petroleum products. The word includes hazardous wastes and toxic substances. The Federal Water Pollution Act, appearing in "United States Code Annotated" (USCA) Title 33 provides information concerning the regulation of discharges of oil and hazardous substances. Discharges of other "contaminants" are defined by applicable Government regulation(s). For example, the Clean Water Act of 1977 includes the discharge of toxic substances under Section 307a and the discharge of conventional pollutants under Sections 301 and 402.

(j) Salvage of Materials

All debris shall become the property of the Contractor and be disposed of by the Contractor at an off-site location at his expense, beyond Board's property.

(k) Vehicular Restrictions

All trucks shall be within legal allowable weight limits according to Local, Parish, or State requirements for truck loads, whichever are more stringent.

Truck routes, within the project areas and through all Board-owned and residential City streets to be utilized by the Contractor during the construction of the contracted work, shall be defined and three (3) copies furnished, if so requested, to the Engineer for review and approval prior to commencing work.

All transportation equipment shall be State inspected, mechanically safe, and equipped with backup/reverse audio alarm movement devices as required by OSHA (Occupational Safety and Health Administration).

Any cranes the Contractor proposes to place on any Board wharf to facilitate the work shall be defined and reviewed by the Engineer prior to placing.

(n) Maintenance of Traffic

The Contractor shall be required shall not disrupt adjacent terminal traffic during the construction of this project. It will be the responsibility of the Contractor to conduct his operations in such a manner as not to block any roads during construction. It is further the responsibility of the Contractor to provide tenants and their customers with reasonable access to their properties at all times during construction and to provide access for emergencies and necessary service vehicles, such as fire fighting equipment and sanitary refuse collection trucks.

The Contractor will be required to provide and maintain all necessary flagmen, police, barricades, warning and detour signs in order to properly facilitate the movement of all traffic at all times when work is in progress that obstructs or is hazardous to traffic safety or impedes traffic flow.

(p) Unfavorable Construction Conditions

Contractor shall be responsible for being aware of unfavorable construction conditions. Contractor shall be responsible for being aware of unfavorable conditions. Contractor shall confine his operations to work which will not be affected adversely by unfavorable weather, wet ground, or other unsuitable construction conditions. No portion of the Work shall proceed under conditions which would affect adversely the quality or efficiency of the Work, unless suitable special precautions or countermeasures are taken by Contractor.

(q) Materials and Workmanship

Contractor shall be fully responsible for furnishing all of his Subcontractors and Suppliers with Contract Drawings and Specifications and Addenda.

All permanent and temporary materials, parts and equipment furnished by the Contractor shall be new high grade, and free from defects and imperfections unless otherwise hereinafter specified. Workmanship shall be in accordance with the best standard practices. Both materials and workmanship shall be subject to the approval of the Engineer.

All materials and workmanship not conforming to the requirements of these specifications shall be considered as defective and will be rejected. Defective material whether in place or not, shall be removed immediately from the site of the work by the Contractor at his expense when so directed by the Engineer. No rejected material, the defects of which have been subsequently corrected, shall be used until approval in writing has been given by the Engineer.

In the event any defect in material or workmanship is of a minor nature and the Engineer determines that it is not of such consequence as to result in a dangerous or undesirable condition, or that the removal of such work would create a dangerous or undesirable condition, the Engineer shall have the right to retain such work and make such deductions in the payment therefore as they determine reasonable and in the public interest. Such determination by the Engineer is final.

(s) Project Signs Not Used

(t) River Stages

Contractor shall schedule his work taking into account the varying stages of the Mississippi River and the following stipulations that prohibit certain activities based on actual river stages. Contractor shall schedule his work accordingly. See SPECIAL CONDITIONS - ARTICLE 3 and SPECIAL CONDITIONS - ARTICLE 4 (f).

Hydrographs are available for review at http://www.mvn.usace.army.mil/cgi-bin/watercontrol.pl?01300

(u) Delivery by Vessel

The Milan Street Wharf should be available for berthing of any vessel that may transport the Cranes to the Mississippi River Intermodal site (Erection Site). The most likely location for off load and path for transporting the Cranes is shown on the Drawings. The Board does not warrant that this is an acceptable off load and transportation plan for the Cranes and it is the Contractor's responsibility to determine an acceptable plan. Contractor shall file for a berth application as specified in the Board's Dock Department Tariff, FMC T-No. 2, as found on the Board's website at www.portno.com. Board shall waive all dockage charges for off-load of Cranes for up to four (4) days. Availability of the designated wharf cannot be guaranteed and the amount of time vessel can be at the discharge wharf may be limited to actual Crane discharge only for up to four (4) days. As such, the vessel may need to dock at another wharf for the removal of sea-fastenings and off load of smaller miscellaneous items. The cost of any shifting of the vessel will be at the Contractor's expense. The Cranes must be moved directly to the RTG Erection Area or RTG Testing Area immediately upon off load – the Cranes cannot remain on the wharf. After which, the Cranes shall be thoroughly washed down with fresh water as required to remove sea salt residue. This shall be repeated as necessary and Contractor shall use Chlor-Rid or other Board-approved system if required to fully remove the sea salt residue.

Contractor shall submit to Board for approval his plan for Crane off load and transport to the Erection Site 30 days prior to vessel arrival.

SPECIAL CONDITIONS

ARTICLE 5 - VALUE ENGINEERING

Not Used

SPECIAL CONDITIONS

ARTICLE 6 - RESPONSIBILITY FOR MATERIALS AND EQUIPMENT

a. Items Furnished by Contractor

Contractor shall be fully responsible for all materials and equipment which he has furnished, and shall furnish necessary replacements until final project completion.

SPECIAL CONDITIONS

ARTICLE 7 - QUANTITIES AND PRICES IF A UNIT PRICE FORM IS PROVIDED

The following clauses are intended only to define units of payment when the Unit Price Form accompanies the Louisiana Uniform Public Work Bid Form, being supplemented by the detail specifications for full description of Contractor's obligations.

The “Total Base Bid” as stated in the Louisiana Uniform Public Work Bid Form is intended to cover full obligations of Contractor. Any and all details not specifically mentioned, but evidently included in the contract, shall be compensated for in “Total Base Bid”.

See ARTICLE 44 for "General Conditions" pertaining to Engineer's Certificates, Payments and Acceptances, particularly those parts of said Articles which pertain to unit price contracts.

General

The Contract Price is the “Total Base Bid” stated on the Louisiana Uniform Public Work Bid Form. The unit prices and estimated quantities shown for those items listed on the Unit Price Form are understood to include all labor, materials and incidental work as may be required to perform the work in these items in accordance with Board's drawings and the specifications and to the satisfaction of the Board.

Incidental work is understood to include, but is not necessarily limited to, all labor and materials required for completing work as required in SPECIAL CONDITIONS - ARTICLE 4 (a).

THIS IS A LUMP SUM BID. NO UNIT PRICE FORM IS PROVIDED FOR IN THIS CONTRACT.

SPECIAL CONDITIONS

ARTICLE 8 - PERFORMANCE OF WORK BY CONTRACTOR

Contractor shall perform at Fabrication Site, in his own shop or in his own plant or yard, and with his own organization, at least 80% of all design and management supervision of all work to be performed under the Contract. If, during the progress of the work hereunder, Contractor requests a reduction in such percentage, and Engineer determines that it would be to the advantage of the Board, the percentage of work required to be performed by Contractor may be reduced, provided written approval of such reduction is obtained in advance by Contractor from the Director of Construction.

The practice wherein the Contractor furnishes a performance bond to the Board for the benefit of another organization which will actually perform the work is deemed to be an assignment of this contract prohibited by GENERAL CONDITIONS - ARTICLE 33 above and a violation of this SPECIAL CONDITIONS - ARTICLE 8. The violation of the provisions of GENERAL CONDITIONS - ARTICLE 33 and SPECIAL CONDITIONS - ARTICLE 8 may result in the disqualification of Contractor to be awarded future contracts with this Board.

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SECTION 1000 - GENERAL REQUIREMENTS

1. PRE-BID INSPECTION

The Contractor is obligated to visit the site and study existing conditions. The Board assumes no responsibility for discrepancies or differences between existing conditions and conditions indicated on drawings or combination of original construction plans (available for review at the Board's office) and recent surveys conducted by the Board. Every reasonable effort has been made by the Board to indicate and describe existing conditions at the project site with an acceptable degree of accuracy, but the Contractor is held responsible for performing his work under existing conditions as he finds them at time of performing work, and payment for extra work will not be allowed because of reasonable discrepancies or differences, which are encountered at time work is performed.

2. CLEAN UP

All debris and material removed shall become the property of the Contractor and shall be removed from the job site and legally disposed of by him, beyond Board’s property unless specifically indicated in the Contract Documents to be re-used.

3. CONSTRUCTION PHOTOGRAPHS

Contractor shall be responsible for the production of monthly construction progress photographs as provided herein. Engineer reserves the right to designate the subject of each photograph.

Photographs shall be taken representative of the work in progress and thereafter weekly throughout fabrication period and shall be submitted prior to the release of monthly progress payments.

Progress photographs shall be taken, bound separately and submitted to Engineer before release of progress payment.

Contractor shall use a digital camera only.

All photographs shall be color photographs of commercial quality. The Engineer reserves the right to reject photographs due to unacceptable quality. The monthly photographs shall be marked with the Board's name and requisition number of the contract, name of Contractor, description of photograph, and date photographed along with a CD containing said photos.

Contractor shall provide a CD disk(s) at end of project containing all photos taken along with a directory with a description of each view and date each photo was taken.

Failure to submit the monthly progress photographs will be cause for the Board to withhold approval of progress payment until such time that the Contractor submits the required photographs.

4. EMPLOYEE IDENTIFICATION CARDS

As a result of heightened Port security measures, all contractors, consultants, testing laboratory representatives, survey representatives and any other service providers seeking access to Board property must first submit on their company's letterhead a list of all employees authorized to be on Port property. This list shall include the respective project/location for which the employee is assigned to perform work, prior to beginning work. Workers must have an employer issued, pictured ID card and current valid photo credentials to validate identification. In the event any immigrant workers are on site, they must carry dual identification/immigration status credentials. Please provide copies of these employee lists via FAX to Construction Services at 504-528-3278; and Harbor Police, LT. Michael Sawyer at 504-528-3384. These lists must be updated and forwarded immediately to both offices prior to any new workers mobilizing to the job site.

Contractor personnel must park offsite of the terminal and be shuttled into the terminal in company-owned vehicles. Company vehicles must have proof of proper insurance. Contractor shall provide to tenants, in advance, a list of the names of personnel requiring access to the terminal and all personnel must have the required picture ID as stated earlier.

The U.S. Coast Guard and the Transportation Security Administration require the Transportation Worker Identification Credential (TWIC) for facilities located within the Port of New Orleans. Contractors, vendors, suppliers and others seeking entry to the below listed facilities of the Port of New Orleans must present, and maintain possession of a valid TWIC card. Persons without a TWIC must be escorted into and remain in the presence of a person with who is a PONO approved TWIC escort. Restricted areas include port property between Felicity Street and Henry Clay Avenue, Alabo Street Wharf, Jourdan Road Wharf, the Julia Street and Erato Street Cruise Terminals, and during cargo activities at Poland Avenue Wharf and Governor Nicholls Street Wharf. Anyone without a TWIC card will need to be escorted at all times by a PONO approved TWIC escort. See paragraph 5 for requirements. Limit is five (5) non-TWIC card holders per one (1) TWIC card holder. However, all persons are encouraged to have a TWIC. For additional information on obtaining a TWIC card go to www.tsa.gov/what_we_do/layers/twic/twic_faqs.shtm.

5. APPROVED TWIC ESCORTS

In order to apply to be a PONO approved TWIC escort the Sponsoring Employer must currently be under contract with the Board. TWIC card holders and their Sponsoring Employer must submit an application to Harbor Police in order to have a TWIC holder as an Approved TWIC Escort for anyone entering the secured area without a TWIC. Applications can be obtained from LT. Michael Sawyer, Port of New Orleans Harbor Police Department, at FAX (504) 528-3374. Upon completion of the contract the approved TWIC escort will be removed from PONO escort privileges.

Training is FIRST required for a TWIC holder to act as an Approved TWIC Escort. Upon completion of required training by the Harbor Police Department of the Port of New Orleans, the Sponsoring Employer shall receive a fully executed copy of the Application/Certification Form, via FAX, certifying that training requirements have been met. A copy of this Application/Certification Form shall be retained by the Approved TWIC Escort who attended the training and the Sponsoring Employer at all times.

Should an Approved TWIC Escort's employment be terminated for any reason, the Employer shall notify Lt. Sawyer immediately.

The training necessary to become an Approved TWIC Escort is stipulated in the Federal Register 33 CFR 105.215. Approved TWIC Escort training consists of:

(1) Review of relevant provisions of the Facility Security Plan, including names and contact number of the Port's and each terminal's Facility Security Officer.
(2) The meaning and the consequential requirements of the different MARSEC levels, including emergency procedures and contingency plans.
(3) Recognition and detection of dangerous substances and devices
(4) Recognition of characteristics and behavioral patterns of persons who are likely to threaten port security
(5) Techniques used to circumvent security measures.

An Approved TWIC Escort and the SPONSORING EMPLOYER fully agree to abide by all provisions and obligations mandated by the Transportation Workers Identification Credential program; agree that they have read a copy of the Port of New Orleans TWIC Escorting Procedure, which is available at the Port of New Orleans web-site www.portno.com; and agree to abide by all provisions and obligations contained in said TWIC Escorting Procedures. The SPONSORING EMPLOYER specifically acknowledges that, as per the Port of New Orleans TWIC Escorting Procedures, the SPONSORING EMPLOYER agrees to accept any fine or liability imposed on the Board of Commissioners of the Port of New Orleans by the United States Coast Guard, or any other regulatory agency, for failure of the Approved TWIC Escort to fulfill required responsibilities.

6. SAFETY ATTIRE

All personnel who enter Port terminals in areas with cargo or construction activity, may be denied access if a hard hat and a safety vest is not worn.

Contractor shall comply with all safety and environment procedures required by New Orleans Terminal, LLC and the site Contractor.

7. MEASUREMENT AND PAYMENT

No separate measurement for payment will be made for work performed and for materials furnished under this section of the specifications for clean-up or construction photographs.

No pay item will be available for clean up or construction photos.

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SECTION 1500 - TEMPORARY FACILITIES, UTILITIES AND OPERATIONS

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SECTION 1500 - TEMPORARY FACILITIES, UTILITIES AND OPERATIONS

1. APPLICABLE STANDARDS

Comply with the requirements of the Manual of Accident Prevention in Construction by Association of General Contractors and/or the current U. S. Occupational Safety and Health Act, whichever is the more stringent.

2. REGULATORY AGENCIES

Comply with Federal, State and local codes and regulations and with utility company requirements. Comply with National Electric Code. Comply where applicable to the latest editions of the Manual on Uniform Traffic Control Devices (MUTCD) and the Louisiana Standard Specifications for Roads and Bridges (LDOTD "Blue Book").

3. TEMPORARY FACILITIES

3.01 Safety Signs and Lighting

Install signs and warning lights as necessary for safety and as necessary to meet insurance, MUTCD, LDOTD and OSHA requirements. Colors shall meet test specified in Section 3 - Color Definitions, ANSI Z 53.1 1988 "Safety Color Code for Working Physical Hazards".

3.02 Fencing, Barricading and Safety Equipment

Where construction is open and accessible by others, build and maintain until construction is completed and accepted, fences, barricades and other necessary construction required to prevent injury to persons on or about Site, including damage to property, and intrusion of unauthorized persons. Barricades and temporary signing shall conform to the latest editions of the Manual on Uniform Traffic Control Devices and LDOTD "Blue Book, Sec. 713."

3.03 Safety Equipment

Provide personal safety equipment for authorized visitors. Provide and maintain warning lights burning from dusk to dawn at barricades.

3.04 Contractor's Field Office

At the Contractor’s option, a temporary trailer, to be utilized as a field office within an area designated by the Engineer may be furnished and installed by the Contractor at no additional cost to the Board. Toilet facilities may be provided within the field office in lieu of or in addition to temporary toilets specified in paragraph 3.06. It may be equipped with approved electrical wiring, telephones service, lighting and outlets, and the required switches and fuses, to provide 110-volt power. It may be equipped with an air conditioning unit to provide cooling in warm or hot weather, and a heater, if properly installed and vented in accordance with the National Fire Protection Association Code, for heating in cold weather, as required. The Contractor shall make the necessary arrangements to obtain telephone service and ENTERGY power required to operate the air conditioning

unit, lights, etc., and the power required for the heater, and shall bear the cost thereof. The outside door of the building shall be equipped with butt hinges and a cylinder lock. The window frames shall be equipped with iron security guards.

The Contractor shall provide a trailer equipped with a fire suppression system in compliance with NFPA 13 anytime a trailer is to be inside or within 10 ft of a facility that is equipped with a fire suppression system.

Any trailer provided by the contractor shall be removed by the Contractor and remain his property after completion of all work under this contract. No separate payment will be made for furnishing, maintaining, providing the prescribed field office and utilities, but the cost of any trailer shall be distributed throughout the existing bid items.

The Contractor shall provide daily janitorial services for this and any other of his temporary buildings at the site throughout the life of the contract. The cost of this service shall be distributed throughout the existing bid items and there will be no separate payment.

3.05 Power and Lighting

Install circuit and branch wiring, with area distribution boxes located so that power and lighting is available throughout the construction by the use of construction-type power cords. Provide adequate artificial lighting for all areas of work when natural light is not adequate for work, and for areas accessible to authorized personnel.

Contractors **shall not** enter power panels on Board property without first contacting Facility Services at 504-528-3500 to obtain **PRIOR** approval to do so. In addition, should the Contractor turn off power to equipment controlling compressors, alarms, pumps, etc., the Contractor **SHALL** be held liable for any and all costs to restore power, reset equipment and/or sprinkler systems, as well as, any and all property and cargo damages sustained as a result of the Contractor's actions.

3.06 Temporary Toilets

Toilet accommodations for use by all workmen shall be furnished and maintained by the Contractor. Keep these facilities clean and sanitary at all times. Provide sewer and water connections, or use approved chemical toilets. Provide toilet tissue holders and tissue. Installation shall be of a type approved by local Health Department authorities. Remove toilets upon completion of work.

3.07 Construction Utilities

Contractors **shall not** open or close any water valves on Board property. Furthermore, Contractors **shall not** connect water lines to the Board's water system, and/or sewer lines to the Board's sewer system. In addition, the Contractor may be assessed a penalty of $1,000 for each illegal hook up. Should the Contractor make an illegal hook up, the Contractor **shall** also be held

liable for any and all costs for damages sustained as a result of the Contractor's actions, including property and cargo damages.

Contractor shall arrange for and pay the cost of water, fuel, electrical energy and operating personnel required for temporary water, light, and power during the entire period of construction. Contractor shall arrange and pay for electrical service as required to provide light and power during the construction period, including any light deemed necessary at storage areas and provide adequate artificial light wherever sufficient natural light is lacking to properly execute the work. Contractor shall be invoiced and shall pay Entergy directly for all electricity charges.

The Board's Facility Services must approve of electrical connections and will notify Entergy to install and release the electrical service meter in the Contractor's name.

METERED TEMPORARY WATER SERVICE CHARGES

There are two types of allowable temporary water service metered connections:

a) Contractor Furnished Meter: For the **Contractor's trailers,** (and **Engineer's trailer** if required to be furnished by the contractor in the contract documents), the contractor shall furnish and install his own water meter(s), size 1 inch diameter, maximum. If water service is not needed for a construction trailer, or if not required in the contract documents, the contractor is not required to furnish a meter. The contractor shall not connect his water meter to trailers unless Facility Services is present to record the meter size, meter number, and record the initial reading.

b) Board Remote Meter: For **all other remote water meters** on the work site, the contractor shall use only the Board's meter, furnished and connected/disconnected by Facility Services, only. NO EXCEPTIONS.

Each meter will be read monthly by the Board with the water usage unit cost being $5.60 per 1000 gallons. The rate is subject to change as the N.O. Sewerage & Water Board adjusts its rates to the Board, or as in the best interest of the Board.

A monthly service fee of $50.00 will be charged for each trailer and remote water meter used by the Board's prime contractors. The connection fee for a Board remote meter is $250.00 per meter. The disconnect fee for a Board remote meter is $250.00 per meter. The charge for a damaged or lost Board remote meter will be $1,000 per meter. In the event a meter is missing, the monthly usage charge to be assigned to the missing monthly reading will be the largest of all previous monthly readings.

Prior to a Contractor's request for water utility services, the Contractor must complete and execute a "Water Utility Request" form and submit it directly to the Board's Construction Services. A copy of this form is available from Construction Services at 504-528-3288. The Board's Facility Services will not provide these forms, nor will they begin service until the form has been completed and processed.

The Board will not provide a remote water meter or water utilities to *subcontractors or to any entity except the prime Contractor*. All meters and water usage must be in the name of the prime Contractor. The exchange or sharing of water meters between Contractors is prohibited, as is the sharing of water with Board tenants.

Should the Contractor disconnect the construction trailer (and Engineer's trailer) meter(s) prior to the Board taking a final reading, he shall be assessed an estimated usage for the water used since the time of the last reading.

DAMAGE TO EXISTING WATER SUPPLY NETWORK

The Contractor is responsible for reporting all water supply system (piping, valves, etc.) damage due to his activities to the Board's Facility Services at 504-528-3500 between the hours of 7:00 am and 2:00 pm, Monday thru Friday. During other hours, report damages to the designated Field Project Representative as designated by the Engineer. This will result in the quickest response time for the Board's water crew to shut-off water service to the damaged line.

Damage to the Board's water supply network by the Contractor or his subcontractor's work force is a Contractor liability, provided the line is reasonably indicated on Board contract drawings. The Contractor is required to make the repairs to the line and have the repairs inspected by representatives of the Board's Construction Services Department and the Facility Services Department prior to requesting the water service restored. The Contractor will be charged for Board labor and material expenses associated with the damaged line, as well as the estimated water loss resulting from the damage, as given in the following table. Water loss will be estimated from the size of the line and the duration of open flow as follows:

LINE SIZE DIAMETER	COST PER MINUTE FOR WATER LOSS
4" and Smaller	$27.00
Between 4" and 12"	$91.00
12" and Greater	$171.00

*Based on Board's cost of water for 2014

If the line is not reasonably shown on the contract drawings, the Board will be responsible for the Contractor's costs associated with repairs and water loss, and will inspect the line prior to returning the line to service.

All water usage charges will be invoiced monthly to the Contractor with back-up documentation attached.

Construction Services will send to Accounting Services via the "Damage Report," and back-up documentation, all charges associated with damages to the Board's water supply network due to contractor activities. The Construction Services Manager will investigate the nature of the water line breakage, and direct reimbursement from the Board's contractor if warranted. This will also be included in the monthly invoice, with

back-up documentation attached. For water piping network damages that are not a contractor responsibility, as determined by the Construction Services Manager, the "Damage Report" will indicate that these charges are not to be charged to the contractor.

3.08 Traffic Maintenance

Post flagmen as necessary for safety and to control vehicular traffic flow in the area of construction operations and for safe transport of material deliveries on Port and municipal streets.

4. TRUCKING

Load all trucks bringing materials to site or removing debris from site in a manner to prevent dropping materials, earth or debris on public and Board streets, roads and highways.

Maintain an installation at all points where and when trucks enter or leave site to remove materials, mud or debris immediately from public and Board streets, roads and highways.

Conform to all local regulations regarding load limits.

5. CLEAN-UP

Remove temporary work when the need for its use has passed. Clean space that was occupied by temporary work. Contractor shall remove debris, rubbish and excess materials from site and legally dispose of beyond Board's property.

Repair damages caused by installation or use of temporary facilities.

6. MEASUREMENT AND PAYMENT

No separate measurement for payment will be made for work performed and for materials furnished under this section of the specifications.

No pay item will be available for temporary facilities, field offices, utilities and operations.

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SECTION 2000 – ENVIRONMENTAL PROTECTION

1. SCOPE

The work covered by this section consists of furnishing all labor, materials, and equipment and performing all work required for the prevention of environmental pollution and the handling, removal, transportation, and disposal of any hazardous and/or regulated solid waste generated during and as the result of construction operations under this contract, except for those measures set forth in other provisions of these specifications. For the purpose of this specification, environmental pollution is defined as the presence of or release of chemical, physical, or biological elements or agents which have the potential to adversely impact human health or welfare; unfavorably alter ecological balances of importance to man; or degrade the utility of the environment for aesthetic and recreational purposes. The control of environmental pollution requires consideration of air, water, and land, and involves noise control, solid waste-management, management of radiant energy, and radioactive materials, as well as other pollutants, including hazardous wastes, materials, substances, and chemicals.

2. QUALITY CONTROL

2.01 General

The Contractor shall establish and maintain quality control for environmental protection to assure compliance with contract specifications, prevailing environmental regulations, and maintain records of his quality control for all construction operations.

2.02 Applicable Regulations

In order to prevent, and to provide for, abatement and control of any environmental pollution arising from construction and/or demolition activities in the performance of this contract, the Contractor and Subcontractors shall comply with all applicable federal, state, and local laws, and regulations concerning environmental pollution control and abatement.

Where required, the Board shall obtain letters of no objection from the Army Corps of Engineers, as well as any relevant state authorities, and including a permit from the Orleans Levee Board for the work.

The Contractor shall be in compliance with all applicable federal, state and local environmental laws. Industrial discharge permits, if any are required, shall be obtained by the Contractor from the Louisiana Department of Environmental Quality (LDEQ) and/or U.S. Environmental Protection Agency (EPA). The Clean Water Act requires industrial and construction activities to obtain a National Pollutant Discharge Elimination

System (NPDES) permit, and the Contractor shall file for any specific permits which may be required regarding the NPDES, which are not covered under the LDEQ small or large general construction permits. In the case of large construction projects affecting five (5) acres or more of land, the Contractor is responsible for filing the Notice of Intent and Notice of Termination.

Included as part of the regulatory requirements for any project affecting one (1) acre or more of land area, is the Contractor's responsibility to submit and obtain Engineer approval of storm water pollution prevention plan (SWPPP), detailed in Section 4.03 of this document. This SWPPP must accompany the Notice of Intent for construction and/or demolition activities. It is the Contractor's responsibility to file the Notice of Intent and Notice of Termination and complete all required paperwork and inspections if they apply to this construction and/or demolition project. Contractor is also responsible to store these documents on site and provide copy to the Engineer, as well as comply with all requirements of the SWPPP.

Further information about LDEQ stormwater requirements concerning construction and/or demolition activities can be found in the following location: http://www.deq.louisiana.gov/portal/Default.aspx?tabid=245.

2.03 Notification

The Engineer will notify the Contractor in writing of any non-compliance with the foregoing provisions and the action to be taken. The Contractor shall, after receipt of such notice, immediately take corrective action. If the Contractor fails or refuses to comply promptly, the Engineer may issue an order stopping all or part of the work until satisfactory corrective action has been taken. No part of time lost because of any such stop order shall be made the subject of a claim for extension of time or for excess costs or damages by the Contractor. Any fines/penalties that are levied against the Contractor or any Subcontractor as a result of failure to comply with the applicable federal, state or local laws regarding environmental pollution control and abatement shall be the responsibility of the Contractor and/or applicable Subcontractor. Furthermore, the necessity for any stop work order may leave the Contractor subject to liquidated damages if appropriate.

2.04 Sub-Contractors

Compliance with the provisions of this entire Section 2000 by Subcontractors will be the responsibility of the Contractor.

2.05 Implementation

Within ten (10) days after receipt of Notice of Award, and prior to mobilizing to commence site work, or as otherwise directed below, the Contractor shall:

(1) Submit in writing, proposals for implementing environmental management practices at the project site, disposal of debris (identifying disposal sites), non-hazardous wastes and hazardous wastes generated at the project site, as well as storage and management of regulated materials, substances, and chemicals brought onto and used at the project site.

(2) Meet with representatives of the Board's Environmental Department to develop mutual understanding relative to compliance with this provision and administration of the environmental protection program.

(3) Where applicable, submit a Waste Management Plan (WMP) to Engineer for approval prior to beginning work for the handling, removal, transportation, and disposal of hazardous and/or regulated solid wastes generated resulting in the Contractor's operation, in accordance with Section 7.03 of this document.

(4) If applicable, all projects affecting over one (1) acre of land will be required to submit to the Engineer a stormwater pollution prevention plan (SWPPP) with a drawing indicating stormwater control measures , as well as the identification of site personnel directly responsible for compliance with the SWPPP**. Engineer acceptance in writing of the SWPPP is required prior to beginning work.**

(5) If applicable, any additional requirements will be provided in Section 10 of this document.

2.06 Environmental Assessment of Contract Deviations

The Contractor is advised that deviations from the construction means, methods, and procedures relative to environmental concerns as indicated by the plans and specifications are not allowed without prior written approval by the Engineer.. Any additional project time required for extended review, processing, and approval time due to changes in methods specified will not be considered as additional contract time or for additional project charges.

3. PROTECTION OF LAND AND RESOURCES

3.01 General

The land resources within the project boundaries and outside the limits of permanent work performed under this contract shall be preserved in their present condition or be restored to a condition after completion of construction that will not detract from the appearance of the project. The Contractor shall confine his construction activities to areas defined by the plans or specifications. The Contractor can elect to perform baseline sampling to determine initial site conditions, upon approval of a sampling plan, as well as submittal of results from the site sampling performed.

3.02 Post-Construction Cleanup or Obligations

The Contractor shall remove all signs of temporary construction and/or demolition facilities such as work areas, structures, foundation of temporary structures, stockpiles of excess or waste materials upon completion of construction.

3.03 Recording and Preserving Historical and Archeological Finds

All items having any apparent historical or archeological interest which are discovered in the course of any construction activities shall leave the archeological find undisturbed and shall immediately report the find to the Engineer so that the proper authorities may be notified. The Contractor shall not cause the find to be further damaged or touched beyond initial discovery until notification to the Engineer and release to commence work following any regulatory authority or Engineer review and approval.

4. PROTECTION OF WATER RESOURCES

4.01 Contamination of Water

The Contractor shall not pollute a water of the State, including lakes, ditches, rivers, bayous, canals, waterways, ground water, or reservoirs with chemicals, fuels, oils, bitumens, calcium chloride, insecticides, herbicides, or other materials harmful to fish, shellfish, or wildlife, which may be detrimental to water quality.

4.02 Erosion Control

Surface drainage from cuts and fills within the construction limits, whether or not completed, and from borrow and waste disposal areas, shall, where turbidity producing materials are present, be held in suitable sedimentation ponds or shall be graded to control erosion within acceptable limits. Temporary erosion and sediment control measures as specified in Section 4.03, “STORMWATER POLLUTION PREVENTION

PLAN," shall be provided and maintained until permanent drainage and erosion control facilities are completed and operative. The area of bare soil exposed at any one time by construction operations shall not exceed that which may be necessary to perform the work. Stream or ditch crossings by fording with equipment shall be limited to control turbidity and in areas of frequent crossings temporary culverts or bridges shall be installed. Any temporary culverts or bridges shall be removed upon completion of the project. Fills and waste area shall be constructed by selective placement to eliminate silts or clays on the surface that will erode and contaminate adjacent streams or waterways.

4.03 Storm Water Pollution Prevention Plan (SWPPP) and Best Management Practices (BMPs)

All construction projects regardless of size should follow best management practices for stormwater management.

A Best Management Practice (BMP), also referred to as a stormwater control measure (SCM), is a technique, process, activity, or structure used to reduce the pollutant content of a stormwater or non-stormwater discharge. BMPs may include simple, non-structural methods such as good housekeeping, staff training, and preventive maintenance. Additionally, BMPs may include structural modifications such as the installation of berms, silt fences, canopies, or treatment control.

Suggested BMPs can be obtained from Ella Barbe, LDEQ Small Business Assistance Program, 201 Evans Rd. Bldg. 4, Suite 420 Harahan LA. Phone 504-736-7739, e-mail: ella.barbe@la.gov

For any project impacting one (1) acre or larger of land area the Contractor must prepare a SWPPP for Engineer approval. See LDEQ Permit Number LAR100000 for storm water discharges from construction activities five (5) acres or more, and LDEQ Permit Number LAR200000 for Storm Water Discharges from Small Construction Activities (equal to or greater than one (1) acre but less than five (5) acres). Both general permit description are available on LDEQ website here: www.deq.louisiana.gov/ under water permits, LPDES permits. These are general permits which apply to all construction projects large and small as defined in those documents. No project specific permit will be issued. The Contractor will be responsible for filing the Notice of Intent and Notice of Termination for projects five (5) acres and larger.

The Contractor shall prepare and maintain a Stormwater Pollution Control Plan (SWPPP) on the form provided, included in this specification, which describes in specific detail the Contractor's program to prevent contamination of the stormwater collection system. Contractor shall implement, maintain, inspect, and remove all erosion and sediment controls identified in the SWPPP. The program shall address both common construction activities and extraordinary events.

Contractor shall include water pollution control drawings (WPCD) in the SWPPP to illustrate the locations, applications, and deployment of BMPs identified in the SWPPP. The WPCDs shall be included as an attachment to the SWPPP.

The Contractor shall comply with laws, rules, and regulations of the State of Louisiana and agencies of the United States Government prohibiting the pollution of lakes, wetlands, streams, or river waters from the dumping of contaminates, refuse, rubbish or debris.

The Contractor shall provide a copy of the SWPPP a minimum of ten (10) working days prior to beginning construction to the Engineer. **Construction shall not begin until the SWPPP is accepted by Engineer in writing.** Contractor shall update the SWPPP as necessary during the work to prevent contamination of the storm water collection system.

Before start of work, Contractor shall train all employees and Subcontractors on the SWPPP and related WPCD and provide the Engineer with written documentation of said training.

The Contractor shall keep a copy of the SWPPP on the job site. The Contractor shall provide continuously at the jobsite all of the tools, equipment, and materials necessary to implement the SWPPP at all times from project initiation through completion, including any punch list or warranty work on the project.

At a minimum the following requirements should be met as applicable, to the maximum extent practicable, at construction sites:

4.03.01 Storm Drain System Protection

At the first order of work, the Contractor shall protect the existing storm drain system from entrance of construction debris and pollutants. Such protection shall include implementing the BMPs as outlined in the SWPPP. Protection shall prohibit the discharge of untreated runoff from temporary or permanent street maintenance/landscape maintenance material and waste storage areas from entering the storm drain system. Sediment that is generated on the project site shall be retained using structural drainage controls. In addition, the protection system shall have a minimum of three features: 1) a particulate filter of geosynthetic material securely fastened in place so that it cannot be bypassed without significant physical damage; 2) a prefilter for the particulate filter; and 3) on-hand materials to close off the inlet or opening in case of a significant pollution spill. Contractor shall monitor and maintain all storm drain inlet protection devices during rain events to prevent flooding.

4.03.02 Material Management & Storage

No construction-related release of materials, wastes, spills or residues shall be discharged from the direct project site. All materials and/or equipment storage areas where liquid construction materials are placed shall be protected by a physical barrier capable of containing 110% of stored liquid capacity. During active construction activities, portions of the barrier may be removed for access. However, the barrier materials must be readily accessible for replacement by onsite construction personnel. The barrier must be in place at all times during the absence of Contractor personnel at the storage site. Building materials should be placed on pallets and covered in event of rain. Materials shall not be stored in the street or gutter area.

4.03.03 Equipment & Vehicle Maintenance

Non-stormwater runoff from equipment and vehicle washing and any other activity shall be contained at the project site and shall not be allowed to discharge from the project site to streets, drainage facilities, or adjacent properties by wind or runoff. The Contractor shall inspect vehicles and equipment coming into the site, on the site, and leaving the site each day. Leaks shall be repaired off-site where possible. If necessary to repair on site, the runoff must be contained or the problem vehicle or equipment shall be removed from the project site until repaired. Where necessary, drip pans should be placed under the vehicles or equipment while not in use to catch and/or contain drips and leaks.

4.03.04 BMP Inspection

The Contractor shall inspect all pollution control BMPs regularly, and shall document their inspection accordingly. The Contractor should also repair/replace any damaged or clogged element on a daily basis. During periods of precipitation where any runoff occurs, the system shall be checked twice a day, seven (7) days a week, whether or not any work has been performed. The daily checks shall be between 6 and 9 a.m. and 4 to 8 p.m. The Contractor shall keep a monitoring inspection log of each inspection.

4.03.05 Spill Prevention & Cleanup Plan

The Contractor shall have a spill prevention plan and spill cleanup materials readily available and addressed in the SWPPP. Contractor shall clean up all spills immediately using dry methods if possible and dispose of spill cleanup material properly. Contractor shall maintain a record of any spills in the inspection log. In addition, at the end of the project, the Contractor must certify in writing to Engineer that all contaminated materials have been properly disposed in accordance with the SWPPP.

4.03.06 Asphalt & Concrete Activities

Asphalt and concrete activities shall be scheduled for dry weather. Contractor shall prohibit saw cutting during a storm event of .25 inches or greater. Contractor shall bags of cement away from gutters and storm drains, sealed and covered, protected from rainfall runoff and wind. Contractor shall place tarp under cement mixer before operating to catch spills. Disposal of cement washout or concrete dust onto driveways, streets, gutters, or storm drains is strictly prohibited.

4.03.07 Pressure Washing

The following methods should be utilized to prevent discharge of pressure washing wastewater into the storm drain system:

(a) Sweep and pick up all areas to be cleaned before using water.

(b) Must use high pressure and low volume of water with no additives and at an average usage of 0.006 gallons per square foot of surface area to be rinsed.

(c) Use a wet/dry vacuum to collect wash water for disposal. Large volumes of wash water may require the use of a small sump pump to remove wash water from the job site.

(d) One or more of the following methods are recommended to prevent pollutants from entering the storm drain system:

- Sandbags can be used to create a barrier around storm drains. *
- Rubber mats or plugs can be used to seal drain openings. *
- Temporary berms or containment pads help keep water on site. *
- Use berms of sandbags to direct wash water to landscaping. *
- Use large squeegees to accumulate sheet flow for collection.

(e) Wash water that may contain hazardous waste such as oil-saturated absorbents, water with lead or other heavy metals from oxidized paint, and solvent cleaners requires special treatment and must be disposed of through a hazardous waste facility.

*Remember to remove plugs, berms, and sandbags or you may be liable for possible flooding.

4.03.08 Employee BMP Training

The Contractor shall train employees and Subcontractors on BMP implementation, general good housekeeping, and proper spill containment and cleanup. Before start of work, Contractor shall provide the Engineer with written documentation of any training and keep all documentation in the SWPPP and on site.

4.03.09 Inspections

The Contractor shall inspect and repair or replace, as needed, all job site BMPs a minimum of, or in accordance with the large or small construction site permit requirements as applicable:

a. Biweekly
b. Before, during and after a major rain event.

The Contractor shall document the inspections in the SWPPP. If the Contractor does not have a construction stormwater inspection form a template as well as guidance for SWPPP development is provided by the U.S. EPA at this link http://cfpub.epa.gov/npdes/stormwater/swppp.cfm

4.03.10 Dewatering

Avoid dewatering discharges, where possible, by using the water for dust control, infiltration, etc.

5. PROTECTION OF FISH AND WILDLIFE

The Contractor shall at all times perform all work and take such steps required to prevent any interference or disturbance to fish and wildlife. The Contractor will not be permitted to alter water flows or otherwise disturb native habitats adjacent to the project area that are critical to fish or wildlife. Any time a colony of nesting birds is discovered in the course of any construction activities, the colony should not be disturbed (i.e., no work within 1,500 feet), and the Contractor shall immediately report the finding to the Engineer so that the U.S. Fish and Wildlife Service or the Louisiana Department of Wildlife and Fisheries may be notified, where applicable.

6. PROTECTION OF AIR

The Contractor shall take all necessary measures to control dusts and emissions from site activities, and shall act to prevent any releases to air at or above the reportable quantity (RQ) for each criteria pollutant. Where any pollutant is released at or above the RQ, the Contractor must report the release in accordance with Section 7.05 of this document. The Contractor is responsible to confine all particulate matter associated with site activities to the boundary of the site, and is responsible for any remediation measures should releases to air of any criteria pollutant leave the site. Control measures for dusts, soils, sands, and other particulates should comply with all requirements indicated in the SWPPP.

7. DISPOSAL

7.01 Disposal of Materials

All debris resulting from operations on this contract shall be legally disposed of at an off-site location. The methods and locations of disposal of materials, wastes, effluents, trash, garbage, oil, grease, chemicals, etc., shall be such that harmful debris will not enter lakes, ditches, rivers, bayous, canals, waterways, or reservoirs by erosion, and thus prevent the use of the area for recreation or present a hazard to wildlife. Storage and disposal and methods should be in accordance with applicable federal, state and local regulation.

7.02 Disposal of Timber

Creosote treated timbers are assumed to be “non-hazardous” materials, but are considered solid waste. Disposal of creosote treated timber can only occur at an industrial landfill. All treated timber and piling that is not recycled shall be disposed of at an industrial landfill according to LDEQ regulatory requirements and Contractor shall provide manifest and disposal records to Engineer as proof. For all treated timber and pilings that are recyclable by a State approved recycler, the Contractor shall also provide manifest and transportation records to the Engineer as proof for transfer of ownership. All costs for testing, where required for disposal or recycling of demolished materials, shall be provided by the Contractor at his expense.

7.03 Disposal of Hazardous and/or Regulated Solid Wastes

If any hazardous or regulated solid wastes are generated as a result of the Contractor's operations, the Contractor shall submit a Waste Management Plan (WMP) that details the proper handling, removal, transportation, and disposal of such wastes within 10 days of Notice of Award to the Engineer for approval.

The WMP shall identify what types of hazardous and/or regulated solid wastes will be generated and shall list the hazards associated with each waste. All waste generated on-site by the Contractor must be properly identified within thirty (30) days of generation. No regulated wastes shall be allowed to accumulate on-site for more than ninety (90) days. Regulated solid wastes are those listed in the Louisiana Administrative Code (LAC), Title 33, Environmental Quality, Part VII, Solid Waste Regulations as amended. The WMP shall include Material Safety Data Sheets (MSDS), where applicable, for all wastes expected to be generated. The plan shall include, but not be limited to the following:

(a) Hazardous waste shall be placed in closed containers and shall be shielded adequately to prevent dispersion of the waste by wind or water. Hazardous

wastes shall be segregated so that incompatible materials are not stored together. Any evidence of improper storage shall be cause for immediate shutdown of the project until corrective action is taken.

(b) Nonhazardous waste shall be stored in containers separate from hazardous waste storage areas.

(c) All hazardous waste shall be transported by a licensed transporter in accordance with Louisiana Administrative Code (LAC), Title 33, Environmental Quality, Part V, Hazardous Waste and Hazardous Materials as amended and 49 CFR 171, Subchapter C as amended.

(d) All nonhazardous waste shall be transported in accordance with local regulations regarding waste transportation.

(e) In addition to the number of manifest copies required by LAC Title 33, one (1) copy of each manifest will be supplied to the Engineer prior to transportation.

(f) The WMP shall identify what types of hazardous and/or regulated solid wastes will be generated, where and how they will be disposed of, and shall list the hazards involved with each waste.

7.03.01 Hazardous Wastes

For the handling, removal, transportation, and disposal of any generated hazardous wastes, the WMP shall conform to the requirements of any detailed specifications as provided in Section 10 of this document (if applicable), the requirements of 40 CFR 260-268, 49 CFR 171-178 as well as other applicable federal, state and local regulations. All employees of the Contractor or Subcontractors that will be directly involved in the handling and/or removal of hazardous wastes shall be trained in accordance with 29 CFR 1910.120. In addition, the employees shall have undergone a medical evaluation in accordance with 29 CFR 1910.120. The Contractor shall include copies of employees' certifications and medical examinations as part of the plan specified herein.

The WMP shall also address the proper Personnel Protective Equipment (PPE) that the employees will be required to wear during the handling and removal of hazardous wastes. The Contractor shall obtain an EPA ID# and Hazardous Waste Disposal Manifests and shall sign the manifests for the generator. Authorization forms are required to be signed by the Engineer prior to disposal. Wastes shall be transported via state and federal approved hazardous waste transporter and treated, stored or disposed of at a RCRA permitted treatment, storage and disposal (TSD) facility. Copies of licenses and certifications of the transporter and TSD shall be included in the WMP. The WMP shall list the name and address of each transporter and TSD to be utilized. The

Contractor shall be responsible for any sampling and analysis required by the TSD for characterization purposes. The Contractor shall submit to the Engineer completed copies of all Hazardous Waste Disposal Manifests within five (5) days after ultimate disposal at the TSD. Other regulations applicable to the handling, removal, transportation and disposal of hazardous wastes are: 40 CFR 261 "Identification and Listing of Hazardous Wastes;" 40 CFR 262 "Standards Applicable to Generators of Hazardous Wastes;" 40 CFR 268 "Land Disposal Restrictions;" and, Louisiana Administrative Code (LAC), Title 33, Environmental Quality, Part V, Hazardous Waste and Hazardous Materials as amended.

7.03.02 Regulated Solid Wastes

For the handling, removal, transportation and disposal of any generated regulated solid wastes, the WMP shall conform to the current requirements of Louisiana Administrative Code (LAC), Title 33, Environmental Quality, Part VII, Solid Waste Regulation as amended. Solid wastes shall be transported to a federal and state approved TSD, oil recycler or Industrial Type I Landfill. The Contractor shall identify in the plan how he/she intends to dispose of each solid waste. The WMP shall include the name, address, licenses, and certifications of each disposal facility that will be used, after written request to, and after approval from the Engineer. If disposal manifests are required, the Contractor shall sign them as the generator. The Contractor shall be responsible for any sampling and analyses that may be required by the disposal facility (ies) for characterization purposes. Licenses, insurance, and certifications of the transporter and disposal facilities shall be included in the WMP. The Contractor shall submit to the Engineer a completed copy of any waste disposal manifests within five (5) days after ultimate disposal.

7.03.03 Laboratory Accreditation

All laboratory testing for waste determinations shall be performed by a laboratory which has Accreditation-Applied status with the LDEQ laboratory certification program. The name and address of the laboratory shall be included in the WMP.

7.04 Maintenance of Pollution Control Facilities

During the duration of this contract, the Contractor shall maintain all facilities constructed for pollution control under this contract as long as the operations creating the particular pollutant are being carried out or until the material concerned has become stabilized to the extent that pollution is no longer being created. Early in the construction period the Contractor shall conduct a training course that will emphasize all phases of environmental protection.

7.05 Reporting of Pollution Spills or Releases

In the event that an oil spill or chemical release occurs during the performance of this contract, the Contractor is required to contact the appropriate authorities immediately, including but not limited to the Harbor Police Department (504) 891-7585 for immediate response, 911 for New Orleans Fire Department Hazardous Materials Response and First Responders, Port Environmental Manager (504) 330-4580, and the LDEQ Single Point of Contact for environmental release reporting (225) 925-6595. In addition, for any release to waterways, Contractor or Board representative must contact the National Response Center, telephone number 1-800-424-8802 as soon as possible, or if telephone communication is not possible, the nearest U.S. Coast Guard office may be contacted by radio to report the spill, (33 CFR 153.203). The Contractor shall comply with any instructions from the responding agency concerning containment and/or cleanup of the spill.

8. NOISE

The Contractor shall adhere to the City of New Orleans code of Ordinances, Chapter 66, Article IV NOISE as amended. Construction and demolitions activities shall not begin before 7 a.m. or continue after 6 p.m. within 300 feet of residential zones. Construction and demolition activities beyond 300 feet of residential zones shall not begin construction before 7 a.m. on weekdays or before 8 a.m. on weekends nor continue after 10 p.m. on any day of the week. See Article 7 of General Conditions of these specifications regarding prior approval to work nights, weekends or holidays.

In addition, the maximum exposure level (as measured in accordance with the City ordinance) between the hours of 7 a.m. and 10 p.m. shall not exceed 70dBa.

9. PRECONSTRUCTION SUBMITTALS

The following list of documents is the Contractor’s responsibility to be submitted to and approved by the Engineer prior to beginning any work. Each item below contains multiple requirements already detailed earlier in this Section 2000. As such, the section number is included in parentheses as a reference to find additional details:

9.01 Environmental Management Plan

Within ten (10) days after receipt of Notice of Award, all Contractors must submit a brief Plan describing the Contractors environmental management practices that will be implemented on the project site and any related staging areas (Section 2.05). This Plan should reference and/or include items 9.02, 9.03, 9.04, and 9.05 as described below, if applicable.

9.02 Waste Management Plan

Where applicable, a Waste Management Plan (WMP) detailing the handling, storage, removal, transportation, and disposal of hazardous and/or regulated solid wastes generated as a result of the project (Section 7.03).

9.03 Stormwater Permit and/or Notice of Intent

Where applicable, the Contractor must submit National Pollutant Discharge Elimination System (NPDES) permits and/or the filed Notice of Intent (for projects five (5) acres or larger) to the Engineer (Section 2.02).

9.04 Stormwater Pollution Prevention Plan

For all projects affecting one (1) acre of land or greater, within ten (10)days of Notice of Award the Contractor must provide a Stormwater Pollution Prevention Plan (SWPPP) with Water Pollution Control Drawings (WPCDs) illustrating stormwater control measures (BMPs) and the other required sections as referenced (Section 4.03) to the Engineer for approval.

9.05 Project-Specific Submittal Requirements

Any additional, project-specific submittals as defined in Section 10, if applicable.

10. PROJECT-BASED DETAILED SPECIFICATIONS, IF APPLICABLE

If applicable, this section will include any project-based detailed specifications, such as lead or asbestos abatement, PCB handling, or specific stormwater management controls required for the project. Any pre-construction submittals related to this section will also be listed above in Section 9.05.

11. MEASUREMENT AND PAYMENT

No separate measurement for payment will be made for work performed and for materials furnished under this section of the specifications.

No pay item will be available for environmental protection.

BOND

TO THESE PRESENTS NOW COMES AND INTERVENES

a Surety Company duly authorized to do and doing business in State of Louisiana, and the City of New Orleans, (hereinabove and hereinafter sometimes referred to as Surety) and which binds and obligates itself jointly, severally and solido, with said Contractor herein, to and in favor of BOARD OF COMMISSIONERS OF THE PORT OF NEW ORLEANS, in the sum of Dollars ($) for the faithful and satisfactory performance by Contractor of all of the obligations assumed by, or imposed upon, Contractor in this agreement, and the payment by Contractor for all work done, labor performed and material furnished under this agreement, in accordance with the Louisiana Revised Statutes of 1950, Title 38, Section 2241, et sequitur, or as the same may be otherwise supplemented and amended. The condition of this obligation is such that if Contractor, shall well, truly, faithfully and satisfactorily perform all of the obligations assumed by, or imposed upon, Contractor by this agreement, as provided for and included within the terms of said Louisiana Revised Statues of 1950, and Contractor and all sub-contractors shall pay for all work done, labor performed or materials or supplies furnished under said agreement, or for transportation and delivery of such materials or supplies to the site of the job by a for hire carrier, or for furnishing materials or supplies for use in any machines used in connection with said agreement, then this obligation shall be null and void and of no effect; otherwise, it shall remain in full force and effect, and no modifications, omissions, or additions, in or to the terms of said agreement, or in or to the Plans, Specifications and Bid, or in the manner and mode of payment, shall in any manner affect the obligations of Surety.

Surety hereby consents and yields to the jurisdiction of the Civil District Court in and for the Parish of Orleans, State of Louisiana, and hereby formally waives any plea to the jurisdiction on account of residence of domicile elsewhere, in the event of suit under this agreement and bond, and Surety herein shall be limited to such defenses only as Contractor could make

IN WITNESS WHEREOF, the parties hereto have executed this agreement in multiple originals in New Orleans, Louisiana, on the dates hereafter set forth to be effective on the last date executed by a party hereto.

BOARD OF COMMISSIONERS OF THE
PORT OF NEW ORLEANS

WITNESSES:

BY:_____
GARY P LAGRANGE
PRESIDENT & CEO

DATE:_____

_____

_____

NAME OF CONTRACTOR

WITNESSES:

BY:_____

DATE:_____

_____

_____

Req. No. 071952

ACKNOWLEDGEMENTS

STATE OF LOUISIANA
PARISH OF ORLEANS

On this _____ day of _____ , 2014 before me personally came and appeared Gary P. LaGrange, to me known, who being by me duly sworn, did depose and say that he is the President and CEO of the Board of Commissioners of the Port of New Orleans, the political subdivision of the State of Louisiana described in and which executed the foregoing contract; and that he signed his name thereto pursuant to authority granted to him by the Board of Commissioners of Port of New Orleans; and that said instrument is the full and free act and deed of Board of Commissioners of the Port New Orleans.

And the said Gary P. LaGrange did further produce to me sufficient proof that he is the President and CEO of said Board of Commissioners of the Port of New Orleans and that he was duly authorized by Board of Commissioners of the Port of New Orleans to execute the foregoing instrument, and I, the Notary Public, hereby certify that the signature of said Gary P. LaGrange on the foregoing instrument is authentic.

_____
NOTARY PUBLIC (signature)

_____
NOTARY PUBLIC (printed name)

_____ _____
NOTARY PUBLIC NUMBER EXPIRATION DATE

STATE OF LOUISIANA
PARISH OF ORLEANS

On this _____ day of _____ , 2014, before me personally came and appeared (REPRESENTATIVE OF COMPANY), to me known, who, being duly sworn, did depose and say that he is the (TITLE) of (NAME OF COMPANY), described in and which executed the foregoing contract; and that he signed his name thereto pursuant to authority granted to him by (NAME OF COMPANY); and that said instrument is the full and free act and deed of (NAME OF COMPANY).

And the said (REPRESENTATIVE OF COMPANY) did further produce to me sufficient proof that he is (TITLE) and that he was dully authorized by (NAME OF COMPANY), to execute the foregoing instrument, and I, the Notary Public, hereby certify that the signature of said (REPRESENTATIVE OF COMPANY) is authentic.

_____
NOTARY PUBLIC (signature)

_____
NOTARY PUBLIC (printed name)

_____ _____
NOTARY PUBLIC NUMBER EXPIRATION DATE

THE BOARD OF COMMISSIONERS
OF THE
PORT OF NEW ORLEANS

PORT NOLA
THE PORT OF NEW ORLEANS

TECHNICAL SPECIFICATIONS

ELECTRIC RUBBER TIRE
GANTRY CRANES

MISSISSIPPI RIVER INTERMODAL TERMINAL
NEW ORLEANS, LOUISIANA

REVISION	1
REVISION 1ATE	22 OCT 2014

PREPARED BY

BOOS NAVARRE, LLC
DAPHNE, AL

UNDER CONTRACT BY

AECOM TECHNICAL SERVICES, INC.

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1. Document Control

1.1. Document History

Revision	Date of Issuance	Description of Revisions
0	29 AUG 2014	ORIGINAL DOCUMENT
1	22 OCT 2014	General technical revision

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2. Project Overview

2.1. Objective

2.1.1. These Specifications are intended to provide the basis for the engineering, design, fabrication, assembly, erection, transportation, testing, & commissioning of electric rubber tire gantry container handling cranes (E-RTG Cranes or Crane), suitable for safe, efficient, and reliable handling of shipping containers and other break bulk cargo, with due consideration on performance, reliability, maintainability, and safety.

2.1.2. Performance characteristics, crane stability, and all other design aspects shall meet or exceed the minimum requirements of these Specifications while not exceeding the maximum allowable wheel loads unless a deviation has been authorized in writing by the Engineer.

2.2. Scope of Supply

2.2.1. The Contractor shall supply two (2) E-RTG Cranes in accordance with these Specifications according to the Contract Schedule.

2.2.2. While these Specifications reference the singular “Crane”, the requirements apply to all E-RTG Cranes included with this Contract.

2.2.3. Each Crane shall be supplied with one (1) telescopic twin-twenty spreader per 5.3.

2.2.4. One (1) spare telescopic twin-twenty spreader identical to the spreaders supplied per 2.2.3 shall be provided.

2.3. Site Location

2.3.1. The Crane shall be placed into service at the Mississippi River Intermodal Terminal (Terminal), part of the Napoleon Avenue Terminal located in New Orleans, Louisiana, USA.

2.3.2. The Terminal is located on property under the ownership and control of the Board of Commissioners of the Port of New Orleans (Board).

2.4. Precedence of Design

2.4.1. If conflicts exist, the more stringent criteria of the Contract documents or standards shall be satisfied, unless approved in writing by the Engineer.

2.4.2. The order of precedence of design shall be:

2.4.2.1. These Specifications, the Contract documents, as well as any appendices, clarifications, approved deviations, minutes of meetings, etc.

2.4.2.2. All applicable Federal, State, & Local Laws, Standards, and Codes

2.4.2.3. All applicable industry standards, codes, and norms

2.4.2.4. The Contractor’s internal or typical standards shall only apply when these standards exceed the minimum requirements of the preceding documents and when approved by the Engineer.

2.4.2.5. Purchased component supplier and subcontractor standards shall only apply when these standards exceed the minimum requirements of the preceding documents and when approved by the Engineer.

2.5. Languages

2.5.1. All correspondence throughout the project shall be in English

2.5.2. Operator's manuals, maintenance manuals, software documents, etc. shall be in English.

2.5.3. All CMS screens, operator's displays, and control panels shall be in English.

2.5.4. All signage on the Crane for operations, maintenance, & safety shall be in English.

3. Crane Overview

3.1. General Description

3.1.1. The Crane shall be a sixteen (16) wheel electric rubber tire gantry container handling gantry crane with the primary operational function of loading and unloading standard ISO shipping containers from terminal tractors and railroad flat cars.

3.1.2. The Crane shall be custom designed for this Contract with particular emphasis on performance, reliability, maintainability, and safety.

3.1.3. The Crane shall be delivered complete with telescopic container handling spreader and spare parts as defined in these Specifications.

3.2. Operational Functions

3.2.1. Operating Mode

3.2.1.1. The primary operating function of the Crane shall be for the loading and unloading of containers under telescopic spreader in a continuous duty cycle.

3.2.1.2. The Crane shall be able to operate in single lift and twin-lift mode, as follows:

3.2.1.2.1. 20', 40', 45', 53' (with 40' or 45' lift positions) containers in single lifts

3.2.1.2.2. 20' containers in twin-lifts with up to 5 ft (1.6m) gap between containers

3.2.1.3. Under all operating conditions, the Crane shall be capable of simultaneous hoisting and trolley travel, both at full speed.

3.2.1.4. Full speed gantry travel shall be permitted.

3.2.2. Cross Travel Mode

3.2.2.1. The Crane shall be capable of cross travel via turning its gantry wheels 90° from the normal operating position for the purpose of traveling to other areas of the yard.

3.2.2.2. Cross travel shall only be permitted without load.

3.2.2.3. Cross travel shall be permitted only when the Crane is powered by diesel generator supply and shall be prohibited with trailing MV power cable connected. Contractor shall provide necessary interlocks to prevent damage to the MV cable.

3.2.3. Carousel Mode

3.2.3.1. The Crane shall be capable of carousel travel via turning and setting its gantry wheels to a position that will allow it to spin/turn about its center vertical axis.

3.2.3.2. Carousel travel shall only be permitted without load.

3.2.3.3. Carousel travel shall be permitted only when the Crane is powered by diesel generator supply and shall be prohibited with trailing MV power cable connected. Contractor shall provide necessary interlocks to prevent damage to the MV cable.

3.3. Capacity

3.3.1. The overall lifting capacity of the Crane shall consider the combined weights of the lifting system devices and the maximum Rated Load.

Description	English Capacity	Metric Capacity
Single Lift under Spreader	50LT	50.8 t
Twin Lift under Spreader (Rated Load)	60LT	61.0 t
Exceptional Twin Lift under Spreader	65 LT	66.0 t
Eccentric Load	Combined 10% eccentricity in both longitudinal and transverse directions for single lift and twin lift	
Eccentric Twin	One (1) container with eccentric load (32.5 LT) and one (1) container empty	
Headblock Weight	4 LT – 5 LT	4.1 – 5.1 t
Spreader Weight	12.5 – 13.5 LT	12.7 – 13.7 t
Certification Test Load (at < 10% speed)	125% of Rated Load	

3.4. Dimensions

3.4.1. As a minimum, the Crane shall be designed in accordance with the specific operational dimensional parameters as follows:

Description	English Capacity	Metric Capacity
Gantry Wheel Gage (Span)	86 ft	26.21 m
Lift Above Ground (under spreader)	40 ft	12.19 m
Number of container rows in Stacking Area	4+1*	
Maximum Slope (any direction)	2°	
Overall width	39.6 ft	12.06 m

*The Crane will be lifting containers from railroad flat cars and terminal tractor chassis; stacking containers up to two (2) high onto railroad flat cars.

3.4.2. For maintenance and accessibility requirements, the Contractor may need to provide additional length, height, or clearance to these operational parameter dimensions. Any deviation from the specified parameters must be approved by the Engineer.

3.4.3. Design Equipment & Clearances

3.4.3.1. The dimensions provided in 3.4.1 are based on the requirements for the Crane to interface with a typical terminal tractor chassis and railroad flat car.

3.5. Speeds & Accelerations

3.5.1. Speed Parameters

Description	English Speed	Metric Speed
Main Hoist (10 LT under spreader)	200 ft/min	60.96 m/min
Main Hoist (60 LT Rated Load under spreader)	100 ft/min	30.48 m/min
Main Hoist (65 LT exceptional lift)	TBD ft/min	TBD m/min
Trolley Travel (0 – 65 LT under spreader)	225 m/min	68.58 m/min
Gantry Travel (10 LT under spreader)	440 ft/min	134.11 m/min

Gantry Travel (60 LT under spreader)	225 ft/min	68.58 m/min
Gantry Travel (65 LT under spreader)	TBD ft/min	TBD m/min
Gantry Cross Travel (0 LT under spreader)	TBD ft/min	TBD m/min

3.5.2. Acceleration Parameters

Description	Acceleration/Deceleration Time
Main Hoist (10 LT)	3.0 s
Main Hoist (60 LT Rated Load)	1.5 s
Main Hoist (65 LT Exceptional Lift)	TBD s
Trolley Travel (0 – 65 LT under spreader)	4.0 s
Gantry Travel (10 LT under spreader)	8.0 s
Gantry Travel (60 LT under spreader)	4.0 s
Gantry Travel (65 LT under spreader)	TBD s

3.5.3. The above speeds and accelerations shall not be limited throughout the entire operational range of the Crane.

3.5.4. The above speeds and accelerations shall consider the worst case combination of wind and runway gradient.

3.5.5. Calculations shall be based on the required speeds and accelerations in the specifications. The actual acceleration shall be adjustable in the CMS.

3.6. Site Design Conditions

3.6.1. General

3.6.1.1. The Crane shall be designed for the environmental conditions of the Erection Site for a marine intermodal terminal which is a salty, dust laden environment with pollution from emissions of terminal operating equipment and facilities.

3.6.2. Temperature & Humidity

3.6.2.1. All structural, mechanical, & electrical design shall consider the following ambient temperature range, effect of solar radiation, and humidity:

Description	English	Metric
Minimum Ambient Temperature	-4° F	-20° C
Maximum Ambient Temperature	104° F	40 ° C
Maximum Temperature from Solar Radiation	122° F	50 °C
Maximum Relative Humidity	100%	

3.6.3. Wind Speeds

Description	English	Metric
Maximum Operating Wind Speed	54 mph	24 m/s
Maximum Stowed (out-of-service) Wind Speed	150 mph	67 m/s
Microburst Wind Speed	90 mph	40 m/s

3.6.4. Seismic Criteria

3.6.4.1. A minimum factor of 20% (DL+TL+LS+LL) shall be considered in any horizontal direction with the trolley and lifted load at the most adverse position.

3.6.4.2. LL can be omitted for stowed earthquake loading.

3.6.5. Gantry Runway

3.6.5.1. The gantry runway is an unreinforced concrete slab.

3.6.5.2. The maximum gradient of the gantry runway shall not exceed 2% in any direction.

3.6.5.3. Gantry drive equipment shall be outboard of the Crane.

3.6.5.4. Electrical equipment, panels, & boxes shall be located outboard of the Crane.

3.6.5.5. Maintenance control stations shall be located outboard of the Crane.

3.6.6. Gantry Loading

3.6.6.1. Gantry runway & tire loadings shall not exceed the following maximum allowable loading:

Description	English	Metric
Operating Wheel Load	72.5 k	32.9 t
Stowed Wheel Load	72.5 k	32.9 t
Operating Runway Ground Pressure	200 psi	13.8 bar
Stowed Runway Ground Pressure	200 psi	13.8 bar

3.6.6.2. Gantry loading calculations shall consider a minimum 5% increase over calculated dead weights due to variations between design weights and as built weights. If, in the Contractor's experience, the expected as built weight may exceed 5% of the design weight, the Contractor shall use the more stringent contingency.

3.6.6.3. Gantry loading shall consider maximum wind speeds and rated loads as described in these Specifications as well as all attachments and equipment (mechanical & electrical), conduit, wiring, piping, fluids, welding, paint, etc.

3.6.7. Gantry Travel

Description	English	Metric
Gantry Runway Length	1,550 ft	472.4
Maximum Required Crane Travel (from MV cable feed point)	775 ft	236.2 m

3.6.8. Tie Downs

3.6.8.1. As the tie down lugs have not yet been installed along the runways, the tie down devices location and capacity shall be finalized through coordination between the Contractor and the Engineer.

3.6.8.2. Location

3.6.8.2.1. Tie down lugs along the gantry runway are located as follows:

Description	Each Corner	
Quantity	1	
Distance from Wheel Centerline	TBD ft	TBD m
Distance from Trolley Centerline	TBD ft	TBD m

3.6.8.3. Size

Description	Each Rail	
Lug Width	TBD in	TBD mm
Lug Hole Diameter	TBD in	TBD mm

3.6.8.4. Capacity

Description	Each Rail	
Tie Down Lug Capacity	TBD k	TBD t

3.6.8.4.1. The tie downs shall be designed for 120% of the maximum calculated uplift force.

3.6.8.4.2. The tie down lugs are designed for uplift only.

3.6.9. Electrical Supply

3.6.9.1. Main Power Supply

3.6.9.1.1. Electrical supply voltage to the Crane shall be 4160V / 3Ph / 60 Hz power from the terminal feed to the Crane connection power terminal box located along the gantry runway per 3.6.7.

3.6.9.1.2. The medium voltage power trailing cable shall terminate at the Crane power terminal box.

3.6.9.1.3. The medium voltage power trailing cable shall lie directly on the ground outside of the diesel side crane runway.

3.6.9.2. Communication

3.6.9.2.1. Communication with the maintenance buildings shall be via fiber optic through the high voltage trailing cable. Contractor shall supply plug and receptacle pair compatible with fiber optic cable.

3.6.9.3. Crane Voltages

3.6.9.3.1. Main Transformer to Inverters: 480 VAC, 3 Ph, 60 Hz.

3.6.9.3.2. Controls: 120 VAC, 1 Ph, 60 Hz and/or 24 V DC

3.6.10. Flooding

3.6.10.1. The Crane will be located on the protected side of the flood protection system of the Mississippi river; nonetheless, the Crane may be subject to flooding.

3.6.10.2. The Crane and all components, except gantry motors, located up to 2m above the gantry runway shall be designed to withstand being submerged without damage. Gantry motors shall require removal for cleaning and drying. If any other mechanical or electrical components are locate lower than 2m, they must be easily removable prior to a potential flooding event.

3.6.10.3. The only required action prior to a flooding event shall be to stow and tie-down the Crane and disconnect the power supply.

3.6.10.4. The Crane design shall consider minimum requirements for placing the Crane in service after flooding recedes. The Contractor shall identify any/all components which may require removal and refurbishment after being submerged/

3.6.10.5. Flooding design considerations shall include:

3.6.10.5.1. Watertight enclosures, connections, panels

3.6.10.5.2. Self-draining of non-watertight components

3.6.10.5.3. Ease of cleaning (no disassembly required)

3.6.10.5.4. Wave action, water current flow, floating debris forces and protection

3.7. Reliability & Maintainability

3.7.1. Each aspect of the Crane shall be designed and optimized for reliability and maintainability.

3.7.2. Components of common brand and manufacturer and/or identical components shall be used as much as possible to reduce spare parts requirements and increase maintenance personnel familiarity with components.

3.7.3. Access to all components, cabinets, panels, & switches shall be provided for safe, convenient routine and preventative maintenance.

3.7.4. Components installed on the Crane, from a manufacturer not on the Major Component Supplier list in 30.2, shall be from a reputable manufacturer who meets the following requirements:

3.7.4.1. Maintains local sales and support services in the vicinity of the Terminal and provides contact information for local offices and key personnel.

3.7.4.2. Provides a reference list of installations within the last 5 years and contact information for end users.

3.7.4.3. Approved by the Engineer

4. General Design Requirements

4.1. General

4.1.1. The Crane performance, configuration, wheel loads, stability requirements and all design criteria shall conform to these Specifications unless otherwise authorized in writing by the Engineer.

4.1.2. The Contractor shall be responsible for being knowledgeable of all the specific design, performance, operational, safety and maintenance requirements for container handling cranes and intermodal operations.

4.1.3. The Crane design shall consider and be suitable for operation up to a maximum of twenty-four (24) hours a day in the atmospheric conditions described in 3.6.

4.1.4. The acceptance of any component or system proposed by the Contractor as "equal", "approved equal" or "alternative" design or component supplier will be at the sole discretion of the Engineer.

4.2. Crane Classifications

4.2.1. The Crane structural frame, girder, gantry and trolley structural components shall be designed in accordance with F.E.M. 1.001, 3rd Edition Revised 1998. 10.01 Booklets 1 to 8 based upon the following criteria:

Classification	Symbol
Utilization	U7
Spectrum Class	Q2
Group Classification	A7

4.2.2. The components of the Crane main systems shall be designed in accordance with F.E.M. 1.001, 3rd Edition Revised 1998. 10.01 Booklets 1 to 8 based upon the following criteria:

Mechanism	Duration (hrs)	Class of Utilization	State of Loading	Group Classification
Main Hoist	25000	T7	L2	M7
Trolley Travel	25000	T7	L2	M7
Gantry Travel	25000	T7	L2	M7

4.2.3. The Crane electrical design shall be in accordance with the National Electric Code (NEC) and all components shall be UL listed.

4.3. Load Spectrum

4.3.1. Main Load Spectrum

Travel Distance	# Cycles
Truck Lane to Lane Outside Rail Track (P1)	500,000 cycles
Truck Lane to Center of Mid Rail Tracks (P2 & P3)	1,000,000 cycles
Truck Lane to Inside Rail Track (P4)	500,000 cycles

4.4. Design Life

4.4.1. The design of the Crane shall be such to provide a minimum useful life of 20 years with a minimum utilization of 2000 hours of container handling operations per year. At the end

of this period the Crane shall be able to provide additional years of service with the implementation of minimal refurbishments to the main or secondary components and/or systems.

4.4.2. The Contractor shall identify the recommended regular, routine and preventative maintenance program requirements to be implemented by the Board to achieve the 20 year life and utilization.

4.4.3. The Crane main system components such as drums, gearing, shafts and other mechanical components shall be designed for the useful life of the Crane.

4.4.4. The replacement life of all wearing components such as wire ropes, sheaves, seals, bearings, wheels, rollers and mechanical components shall be identified by the Contractor during the design phase and will be subject to the Engineer's approval.

4.4.5. All components installed on the Crane, inclusive of the electrical and control system, shall be supported by the component or system manufacturer for a minimum ten (10) years after Substantial Completion of the Crane unless otherwise approved by the Engineer.

4.4.6. The Crane fatigue design shall be in accordance with 7.10.

4.5. Design Capacity

4.5.1. The Crane design shall provide for reliable, safe and efficient continuous and intermittent operation at the maximum speeds, acceleration and deceleration noted in this Specification.

4.5.2. The Crane structural, mechanical and electrical design shall be in accordance the following criteria:

Description	Capacity	Metric Capacity
Rated Load (Single Lift)	50 LT	50.8t
Rated Load (Twin Lift)	60 LT	61.0 t
Exceptional Load (Twin Lift)	65 LT	66.0 t
Fatigue Lifted Load Continuous Operation	35 LT	35.6 t
Fatigue Lifted Load Intermittent Operation	40 LT	40.6t
Lifted Load One (1) hour Duty Cycle Operation (Thermal Sizing)	50 LT	50.8t

4.6. Duty Cycle

4.6.1. The theoretical duty of the Crane main hoist and trolley motions shall be used for the design of the main hoist and trolley drive components and calculation cycle time. The theoretical duty cycle shall be based upon:

4.6.1.1. Rated Load 60 LT (61.0t)

4.6.1.2. Main hoist and trolley travel functions occur simultaneously.

4.6.1.3. Maximum acceleration, speed and deceleration for each cycle motion

4.6.1.4. 50% maximum operating wind velocity according to 3.6.3.

4.6.1.5. Maximum ambient temperature according to 3.6.2.

4.6.1.6. Duty Cycle is repeated continuously and indefinitely

4.6.2. Main Hoist and Trolley Theoretical Duty Cycle

4.6.2.1. The duty cycle sequence shall be based upon loading a full rated load container from the truck lane to the railcar and discharging a container from the railcar to the truck lane. The theoretical duty cycle sequence shall be based upon the following double cycle operation:

Cycle Step No.	Operation Description	Dwell Time
Prior to Start	Spreader resting on a container in the truck lane.	
1	Lock twistlocks and engage the container	2 s
2	Hoist to full hoist height and travel to center of railroad flat car track P1.	
3	Lower to the railroad flat car.	
4	Unlock twistlocks and disengage the container	2s
5	Hoist to full hoist height	
6	Travel to center of the railroad flat car track P3.	
7	Lower to railroad flat car.	
8	Lock twistlocks and engage the container	2 s
9	Hoist to full hoist height and travel to the center of the truck lane.	
10	Lower the container onto a truck chassis	
11	Unlock twistlocks and disengage the container	2s
12	Raise the spreader 3m	
13	Wait for truck	10s
14	Lower the spreader 3m	
	Repeat Cycle	

4.6.2.2. Only the theoretical dwell times shown are to be considered in calculating the design duty cycle.

4.6.3. Gantry Theoretical Duty Cycle

4.6.3.1. The theoretical duty to be used for the design of the gantry drive components shall consider:

4.6.3.1.1. Full rated load

4.6.3.1.2. Maximum operating speed

4.6.3.1.3. Maximum acceleration

4.6.3.1.4. Maximum operating wind load from the most adverse direction

4.6.3.1.5. Up the maximum grade

4.6.3.1.6. Gantry travel every four (4) container duty cycles

4.6.3.1.7. Travel the full length of gantry runway and back to position every thirty (30) minutes.

4.6.3.2. The sizing of components shall be based upon a single cycle with no intermittent stops.

4.6.4. Trim and Skew Theoretical Duty Cycle

4.6.4.1. The theoretical duty to be used for the design of the trim and skew components shall be two complete cycles of maximum trim and skew in both directions every four (4) container lifts.

4.6.5. Other Duty Cycles

4.6.5.1. The theoretical duty cycle for components and systems which support a main system shall have a duty cycle and load spectrum at least as severe as the as the main system theoretical duty cycle.

4.6.5.2. The gantry cable reel components shall have a duty cycle at least as severe as the gantry drive.

4.7. Duty Cycle Analysis

4.7.1. The Contractor shall submit a duty cycle analysis for each main motion duty cycle.

4.7.2. The electrical drive supplier shall provide a duty cycle analysis of the main motion drives and motors. The analysis is in addition to the Contractor's analysis and shall confirm the adequacy of the selected components for compliance with the requirements of these Specifications.

4.7.3. The Contractor and the electrical drive supplier shall provide a maximum demand and RMS power demand analysis. The analysis shall consider all main function operation and all auxiliary system power demand.

4.8. Design Standards and Codes

4.8.1. The Contractor shall design the Crane in accordance with the latest edition of all standards referred to in these Specifications and any other local or international standard applicable for container handling crane design.

4.8.2. All electrical components and systems shall comply with NEMA, IEC, IEEE, NEC, UL and other applicable local codes, regulations or bodies having jurisdiction at the site.

4.8.3. The following table provides a list of regulations referred to in these Specifications.

4.8.3.1. Standards Table

Abbreviation		Title / Description
ABMA		American Bearing Manufacturers Association
AGMA		American Gear Manufacturers Association
AISC		American Institute of Steel Construction (ASD)
AISI		American Iron and Steel Institute
AIST		Associations of Iron and Steel Technology (formerly AISE)
ANSI		American National Standards Institute
API		American Petroleum Institute
ASA		Acoustical Society of America
ASCE		American Society of Civil Engineers
ASHRAE		American Society of Heating, Refrigeration, and Air-Conditioning Engineers
ASM		American Society for Metals
ASME		American Society of Mechanical Engineers
ASNT		American Society for Nondestructive Testing
ASTM		American Society for Testing and Materials
AWS		American Welding Society – Bridges and Dynamically Loaded Structures
BSI		British Standards Institute
CMAA		Crane Manufacturer's Association of America
CSA		Canadian Standards Association
DIN		Deutsche Industrie Normen
EN		European Standards

FEM		Federation Europeenne de la Manutention
IEC		International Electrotechnical Commission
IEEE		Institute of Electrical and Electronic Engineers
ISA		Instrument Society of America
ISO		International Standards Organization
JIC		Joint Industrial Council
NACE		NACE International (formerly National Association of Corrosion Engineers)
NEC		National Electric Code
NEMA		National Electrical Manufacturer's Association
NETA		International Electrical Testing Association
NFPA		National Fluid Power Association
NFPA		National Fire Protection Association
OSHA		Occupational Safety and Health Administration of the United States Department of Labor
SAE		Society of Automotive Engineers
SSPC		Steel Structures Painting Council
UL		Underwriters Laboratory

4.9. Construction

4.9.1. The main structure shall consist of box section, seamless tubular members or rolled sections. Spiral wound pipe is prohibited.

4.9.2. Built up sections of back-to-back channels, angles, plates, or other similar built up section are prohibited.

4.9.3. Crimping or flattening of tubular members is prohibited.

4.9.4. All members, to the maximum extent possible shall be made airtight by seal welding. Sealed members shall be pressure tested to 0.105 kgf/cm^2 (1.5 psi) to demonstrate air tightness.

4.9.5. The interior of all members large enough to crawl through shall have access provided for periodic structural inspections.

4.9.6. The installation of shop, shipping, and erection brackets must be submitted to the Engineer for review. All brackets shall be installed during fabrication and prior to painting.

4.9.7. At locations which pockets where water or dirt may collect are unavoidable, drains shall be installed. Pockets shall be avoided whenever possible.

4.9.8. The design shall avoid the use of plates subject to through plate tension. If unavoidable, and approved by the Engineer, shall be inspected 100% UT scanned to detect lamination.

4.10. Materials

4.10.1. All materials and articles for the Crane shall be new, unused, of current design and of recent manufacture to the satisfaction of the Engineer.

4.10.2. The Contractor shall maintain material traceability for all structural members from the mill source throughout the entire manufacturing process. Original mill test reports, documenting compliance with these Specifications, shall be provided for all materials. Certified documents shall be provided from all sources of verification of chemistry, cleanliness, mechanical properties and notch toughness properties. Random destructive batch testing is required to verify mill test reports. Final details of testing will be negotiated after review of quality control procedures.

4.10.3. Materials shall be selected by the Contractor in accordance with F.E.M.

4.10.4. Material for main structural elements shall have a Charpy-V of 27 J/cm^2 at -30°C.

4.10.5. Material used for structural stiffeners shall be the same material as the plate to which it is attached.

4.10.6. The minimum thickness for load carrying structural plates, angles, flat bars, rolled sections, platforms and attachment brackets shall be 8mm.

4.10.7. All plates, bars, and sections shall be well and cleanly rolled to the full sections, free from cracks, surface flaws, laminations, roughness, and other defects.

4.10.8. Forgings and castings, when approved for use by the Engineer, shall be sound, clean, fair, and free from flaws and blowholes. All steel castings shall be properly annealed.

4.10.9. All materials and component design shall maximize corrosion prevention.

4.10.10. Aluminum or its alloys for housings, fans, blowers, motors, brakes, energy chains, and other weather exposed parts are prohibited.

4.10.11. Ferrous electrical system components not protected within weather proof enclosures shall be avoided, whenever possible. When deemed necessary with the Engineer's approval, these components shall be hot-dip galvanized after fabrication but prior to painting.

4.10.12. All non-structural screws, bolts, nuts, washers, pins, studs, shafts, springs, wire rope (excluding main function ropes), and other hardware, fasteners, and fittings shall be 316 stainless steel unless stated otherwise in these Specifications.

4.10.13. All enclosures for structural, mechanical, electrical, electronics, and miscellaneous components shall be 316 stainless steel with a 2.0mm minimum thickness. Welding to any enclosure is prohibited.

4.10.14. All enclosures shall include a permanently installed engraved or embossed stainless steel nameplate describing the enclosure contents/purpose.

4.10.15. Materials of all components shall be indicated on all drawings.

4.11. Welding

4.11.1. All welding shall be performed in accordance with AWS D1.1 and other relevant AWS standards such as those for dynamically loaded structures.

4.11.2. All welders shall be certified to AWS D1.1 by an independent laboratory for the material, process, and type of weld being performed. Welder certifications shall be current.

4.11.3. Copies of the testing procedures, welder qualification certificates, and welding procedures shall be made available at the Engineer's request.

4.11.4. Welding performed using unqualified procedures or non-certified welders shall be subject to rejection by the Engineer.

4.11.5. All welds shall be installed in accordance with the drawing dimensions and approved procedures.

4.11.6. Welds shall be clean and of regular appearance and free from porosity, slag inclusions, undercuts, and other defects.

4.11.7. Welding shall be performed to ensure that the weldment is of proper alignment and position, free from distortion, and a homogeneous section of correct dimension.

4.11.8. As much as possible, welding shall be installed in the 1G horizontal/flat position and executed by means of automated or semi-automated processes.

4.11.9. The Contractor shall be responsible for non-destructive testing (NDT) of welds per AWS D1.1 for dynamically loaded structures.

4.11.10. All welding inspectors shall be AWS D1.1 certified level II or level III.

4.11.11. All welding deficiencies shall be repaired in accordance with AWS for dynamically loaded structures.

4.12. Safety

4.12.1. The Crane design shall be in accordance with all local and international safety regulations referred to in this Specification and applicable at the Erection Site.

4.12.2. The Crane component and systems design and configuration shall be in accordance with OSHA regulations.

4.12.3. In event of an electrical power supply, control power, mechanical component or system failure or malfunction, the Crane shall be designed to prevent damage to the Crane or injury to personnel.

4.12.4. The failure or malfunction of an electrical or mechanical component shall safely stop the Crane operation. If the main component or system cannot provide this level of safety a redundant system must be provided, excluding broken main function ropes and spreader twistlocks.

4.12.5. No Crane component or system shall change state in event of a power failure.

4.12.6. The initial startup powering or re-powering of the Crane or any system on the Crane shall not initiate any potentially unsafe or unanticipated condition or motion.

4.12.7. All switchgear shall be designed to reduce the hazard associated with Arc Flash. The Contractor shall provide any relevant Crane data required to allow for an arc flash analysis for the Terminal (including the Crane) in accordance with regulations. All required safety labeling or signage shall be installed at the required locations.

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5. Lifting System

5.1. General

5.1.1. Lifting system devices include all components which are suspended from the main hoist ropes and are used in the lifting of ISO shipping containers or other loads up to the Rated Load.

5.1.2. All lifting system devices shall be designed in accordance with the full requirements of these Specifications including, but not limited to, structural, mechanical, & electrical design, safety, maintainability, fabrication, testing, & commissioning.

5.1.3. The design of the primary lifting system shall be a spreader attached to a headblock that is reeved into the main hoist wire rope system.

5.2. Headblock

5.2.1. The Crane shall be equipped with a headblock consisting of a primary structural frame with two (2) sets of guarded sheave hoist blocks which are reeved into the main hoist system.

5.2.2. The headblock shall allow quick, safe, and reliable manual interchange of lifting devices such as spreaders, over-height adapters, cargo beams, etc.

5.2.3. It is preferred that the headblock be designed for interface with other lifting devices per the Board's direction and approved by the Engineer.

5.2.4. The connection of lifting devices to the spreader is preferred to be by manual horizontal pin connection; however twistlock connection is permitted. The position of each pin or twistlock (locked/unlocked) shall be electrically monitored and integrated into the control system.

5.2.5. Tight tolerances shall be maintained to ensure proper interchangeability of lifting system devices.

5.2.6. The maximum overall size of the headblock shall be 5,800 mm in length and 2,150 mm in width. Headblock designs which exceed these dimensions shall be permitted if the design does not affect interface with the Board's existing spreader design.

5.2.7. The outside edges of the headblock surface shall be smooth and continuous to prevent snagging of adjacent containers or other structures.

5.2.8. The headblock shall be designed to minimize the potential for damage to the main hoist ropes from pinch points, sharp edges, or other objects.

5.2.9. The Crane shall be able to hoist up to 20% full rated speed when no other lifting devices are attached to the headblock.

5.2.10. The headblock shall be provided with four (4) lifting lugs, one at each corner, rated for 20.0 LT each which can be used when no other lifting devices are attached.

5.2.11. The headblock shall be provided with a nameplate which identifies:

5.2.11.1. The manufacturer

5.2.11.2. Serial number

5.2.11.3. Date of manufacture

5.2.11.4. Dead weight

5.2.11.5. Rated capacity

5.2.11.6. Proof load

5.2.11.7. Lifting lug capacity

5.2.11.8. Lifting eye proof load

5.2.12. Each twistlock and lift lug shall have its rated capacity permanently displayed (painted) at a location nearby in characters approximately 50mm high. (ex. "15LT")

5.2.13. Electrical interlocks shall be provided to ensure all spreader locking pins are fully engaged or disengaged. Crane hoist function shall be disabled in the event that all pins are not fully engaged or disengaged.

5.2.14. A receptacle for the spreader cable shall be provided on the headblock which will allow maintenance personnel to disconnect the spreader and still operate the Crane hoist by closing the safety circuit within the spreader cable. The Contractor shall match the configuration of this disconnect to the other Cranes at the Terminal, Pyle National ZREP-20-350PN.

5.2.15. The spreader cable shall be collected on the headblock in a properly designed cable tub.

5.3. Spreader

5.3.1. The separating twin-twenty telescopic spreader(s) shall be provided for primary handling of ISO 20'/40'/45' containers and 53' containers with lifting points at the ISO 40'/45' positions.

5.3.2. The spreader shall be a YTS45E model as manufactured by Bromma.

5.3.3. All motions of the spreader including telescopic movement shall be controlled from the operator's cabin.

5.3.4. The spreader shall be connected to the headblock in accordance with 5.2.4.

5.3.5. All electrical components shall be positioned to prevent accidental damage during operations.

5.3.6. Exposed ends surfaces of the spreader shall be robust and designed to withstand the heavy impact and rough treatment encountered in container handling operations.

5.3.7. All items subject to wear and damage shall be designed for easy replacement.

5.3.8. Mechanical and electrical interlocks shall be provided to ensure safety and reliability.

5.3.9. Landing pins shall be provided at each corner of the spreader to mechanically prevent locking or unlocking of the twistlocks unless the spreader is properly seated/landed on top of the container. Electrical interlocks shall be installed to ensure that twistlock operation is prohibited unless all landing pins are engaged.

5.3.10. Spreader twistlocks shall be ISO "floating" type.

5.4. Alternate Spreader

5.4.1. Alternate spreaders to those required per 5.3 is requested to be offered. Alternate spreaders shall be provided for the base spreaders and spare spreader.

5.4.2. The alternate spreaders shall be an STS45 model as manufactured by Bromma and shall be identical in all aspects to the existing STS45 spreaders currently owned by the Board with the exception of loaded indication proximity switches & plungers.

5.4.3. The YTS45E spreaders are not to be supplied if the alternate spreaders are supplied.

5.4.4. For the alternate spreaders supply, the headblock shall be designed in accordance with 5.2 except as follows:

5.4.4.1. The headblock be designed for interface with other lifting devices per the Board's direction and approved by the Engineer.

5.4.4.2. The connection of lifting devices to the spreader shall be by manual horizontal pin connection only. The position of each pin (locked/unlocked) shall be electrically monitored and integrated into the control system. Twistlock connection is prohibited.

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6. Mechanical Specifications

6.1. General

6.1.1. All mechanical components and parts shall be designed in accordance with these Specifications and the required load combinations, coefficients, and factors.

6.1.2. Design classifications and allowable stresses shall be in accordance with Section 4.

6.1.3. Classification and allowable stresses not identified in Section 4 shall be selected based on the required operation condition and the life expectation. The selected classification shall be subject to approval by the Engineer.

6.1.4. Mechanical components and parts shall have thermal ratings as required based on the theoretical duty cycle of 4.6.

6.1.5. Published catalog information for all purchased mechanical components, materials, and parts shall, as a minimum, include:

6.1.5.1. Safety factors applied

6.1.5.2. Service factors applied

6.1.5.3. Rating criteria and loading condition

6.1.5.4. Material properties (mechanical, chemical, thermal)

6.1.5.5. Electrical supply and power demand

6.1.6. Mechanical assemblies, components, and parts shall be designed with focus on reliability, maintainability, and repair. Where modifications can be incorporated, the Contractor is obligated to make such changes.

6.1.7. No hydraulic components shall be used in any system of the Crane except for components approved on the spreader(s).

6.1.8. All purchased/outsourced mechanical components shall have permanently fixed nameplates according to12.4.

6.2. Main Hoist System

6.2.1. General

6.2.1.1. The main hoist system shall be comprised of a main hoist drive system, wire rope reeving and rope support/guide system, and all other components as required by these Specifications.

6.2.2. Main Hoist Drive System

6.2.2.1. The main hoist drive system shall consist of:

6.2.2.1.1. One (1) electric AC motors

6.2.2.1.2. One (1) high speed caliper disc brake

6.2.2.1.3. One (1) base mounted, enclosed helical gear reduction unit

6.2.2.1.4. Flexible barrel type low speed drum coupling(s)

6.2.2.1.5. Single layer machined groove drum(s)

6.2.2.2. If a two (2) drum main hoist system is provided, each main hoist drive system shall comply with 6.2.2.1.

6.2.2.3. The main hoist drive system shall be mounted on machined surfaces of a rigid base incorporated into the design of the trolley structure.

6.3. Trim and Skew Systems

6.3.1. Trim and Skew systems shall be provided to adjust the spreader position in order to allow easier landing of the spreader onto containers.

6.3.2. The Trim and Skew systems shall meet the following minimum adjustment angles:

Description	0-65 LT Concentric Load	Eccentric Load
Trim	± 5.0°	± 3.0°
Skew	± 5.0°	± 3.0°
Combined Trim/Skew	TBD	TBD
Consideration for rope stretch	± 150 mm	± 150 mm

6.3.3. The systems shall be controlled from the Operator's Cabin with each function able to be adjusted independently of each other.

6.3.4. The positions of trim and skew shall be displayed digitally on the operator's cabin CMS screen and shall be easily readable when adjusting the spreader positions.

6.3.5. The systems shall maintain the selected spreader position under all operating conditions, including motor stall.

6.3.6. The trim and skew systems shall include a "home" position which returns the spreader to the level and square position with a single button push. Maintenance personnel shall be able to re-calibrate the "home" position to account for rope stretch.

6.3.7. After adjusting the Trim and Skew positions, the operator shall be able to save the position to memory for two conditions:

6.3.7.1. Truck – When the trolley position is above the truck lane.

6.3.7.2. Railcar – When the trolley position is within the rail car track area.

6.3.8. The systems shall include an automatic adjustment function which will adjust the spreader position between the memorized "Truck" and "Railcar" positions based on trolley position.

6.3.9. The systems shall be able to be adjusted with full rated load suspended from the spreader and not be limited during hoisting or trolley travel.

6.3.10. The maximum duration for the full range of each system position (from one extreme to the other) shall not exceed 10 seconds.

6.3.11. The systems shall have positive indication of end of travel with protection from over travel. Overtravel protection shall be provided in the control software in addition to limit switches.

6.3.12. A local maintenance operating station or other means of performing operations locally shall be provided for the systems.

6.4. Trolley Travel System

6.4.1. General

6.4.1.1. The trolley travel system shall be comprised of a trolley travel drive system, self-driven trolley, trolley rail, and all other components required by these Specifications.

6.4.2. Trolley Drive System

6.4.2.1. The trolley travel drive system shall consist of:

6.4.2.1.1. Electric AC motor(s)

6.4.2.1.2. High speed caliper disc brake(s)

6.4.2.1.3. Enclosed helical gear reduction unit(s)

6.4.2.1.4. Non-slip drive mechanism(s) to ensure positive traction in all acceleration and braking conditions.

6.4.2.2. The trolley travel drive system shall be incorporated into the design of the trolley structure and is subject to approval by the Engineer.

6.5. Trolley Arrangement

6.5.1. Trolley Arrangement

6.5.1.1. The trolley shall be a self-driven structural frame mounted on four (4) wheels traversing on trolley rails.

6.5.1.2. The complete trolley frame weldment shall be machined in a single setup for all motor, gearbox, brakes, wheel and axle assemblies, guide rollers, etc.

6.5.1.3. The trolley shall support the main hoist and trolley drive systems.

6.5.1.4. The operator's cabin shall be supported from the trolley.

6.5.1.5. Openings in the trolley structure for the main hoist ropes running to the headblock/spreader shall be large enough to prevent scrubbing of the main hoist ropes on the structure considering all possible scenarios including, but not limited to, an emergency stop (E-stop) with the trolley or gantry traveling at full speed with or without rated load and the spreader at any hoist height.

6.5.1.6. Access onto the trolley shall be safe & easy at any point of travel.

6.5.1.7. The trolley shall have toe plates and handrails in accordance with Section 10.

6.5.1.8. Other equipment or components shall be mounted on the trolley as required by these Specifications. Examples include main hoist upper stop limit (two-block), flood lights and maintenance lights, electrical panels, enclosures, & terminal boxes, spreader anti-sway components, etc. All components shall be accessible and maintainable to the satisfaction of the Engineer.

6.5.2. Trolley Wheels & Axles

6.5.2.1. The trolley wheels shall be double flanged solid forged wheels.

6.5.2.2. The wheels shall be a minimum of 400mm in diameter and sized in accordance with F.E.M.

6.5.2.3. Wheel treads shall be case hardened to 45-55 HRC at a minimum depth of 4-6mm.

6.5.2.4. Trolley wheel design shall include eccentric bearing housings or eccentric bushings for adjusting wheel alignment.

6.5.2.5. The trolley wheel & axle assembly shall be removable as a complete unit.

6.5.3. Means of safely decelerating the trolley and reducing impact forces upon collision with the end of trolley travel shall be provided. Pneumatic energy absorption buffers in accordance with 6.20 are preferred. Alternative designs will be accepted subject to verification by the Engineer that the proposed design can limit the deceleration rate and impact forces to those equivalent of pneumatic energy absorption buffers.

6.5.4. Safety drop blocks shall be provided to limit the drop of the trolley to 25mm in the event of a wheel or axle failure.

6.5.5. Jacking provisions shall be provided to facilitate the trolley being jacked up for maintenance activities such as replacing trolley wheels.

6.5.6. Fall prevention devices shall be installed around the trolley rails to prevent the trolley from becoming disengaged with the trolley rails.

6.5.7. Stowage pins or other Engineer approved locking devices shall be provided to secure the trolley for out of service wind conditions and shall be interlocked with the trolley drive system to prevent trolley travel unless the pins are fully disengaged.

6.5.8. A maintenance davit crane with an electric hoist shall be provided on the trolley and shall be capable of reaching, lifting, and lowering to the ground all components installed on the trolley (such as wheels, gearboxes, motors, brakes, sheaves, etc.)

6.6. Trolley Rail

6.6.1. Trolley rails shall be provided for the travel of the trolley.

6.6.2. Trolley rail design, installation, and alignment shall be installed in full compliance with F.E.M.

6.6.3. Subject to the Engineer's approval, based on Contractor's experience, trolley rail profiles may be either:

6.6.3.1. Solid rectangular bars

6.6.3.1.1. Trolley rail hardness shall be a minimum of 170 BHN.

6.6.3.1.2. Trolley rail material grade shall be 510 N/mm^2 or greater and shall be clearly identified by the Contractor on all calculations, drawings, manuals, and other documentation.

6.6.3.1.3. Trolley rail shall be installed by continuous seal welding.

6.6.3.1.4. The design life of the rectangular bar trolley rail shall achieve a minimum 15 year useful life. Design life calculation shall be subject to approval by the Engineer.

6.6.3.2. DIN 536/1991 "A" type rail

6.6.3.2.1. Trolley rail material grade shall be 700 N/mm^2 or greater and shall be clearly identified by the Contractor on all calculations, drawings, manuals, and other documentation.

6.6.3.2.2. Trolley rail hardness shall be a minimum of 300 BHN.

6.6.3.2.3. A continuous steel-reinforced rubber bearing pad shall be installed between the rail base and the horizontal structural member.

6.6.3.2.3.1. The bearing pad shall be a synthetic elastomer rubber pad resistant to crushing, shear, wear, grease, oil and UV light exposure.

6.6.3.2.3.2. The bearing pad shall encapsulate a vulcanized, galvanized steel strip with a minimum width of 90% of the pad width.

6.6.3.2.3.3. The bearing pad shall have edges sealed to prevent ingress of dirt, water, grease, and oil.

6.6.3.2.4. The steel strip at ends, or splices, of the bearing pad shall be sealed. The trolley rail base and web as well as the Crane structure shall be painted before rail installation.

6.6.3.2.5. The trolley rails shall be secured with welded base rail clips.

6.6.3.2.5.1. The upper clip component shall have a vulcanized rubber nose and be secured with hex-head or T-head bolts; conical head bolts are prohibited.

6.6.3.2.5.2. A minimum of 25mm shall be provided between the edge of the weld on the rail clip bases and the edge of a Crane structural member or weld on the Crane.

6.6.3.2.5.3. Clips shall not be installed over splice joints in the Crane structure.

6.6.3.2.6. In addition to the rail clips, the rails shall be restrained in the gantry runway direction by alignment blocks.

6.6.3.2.6.1. The blocks shall be installed in pairs and be spaced a maximum of 7 m.

6.6.3.2.6.2. The blocks shall be welded on all four (4) sides with a flush bevel weld on the side bearing against the trolley rail base.

6.6.4. Trolley rails shall be continuously supported on the horizontal girder members with a continuous vertical web centered below the trolley rails.

6.6.5. The use of shims in the trolley rail system design and installation are prohibited.

6.6.6. Drains shall be provided, as required, along the girder to prevent trapping water between the rail and the structure. The drains shall be spaced no greater than 3m apart and shall have a minimum diameter of 38 mm. The outlet of the drain shall not be flush with the structure to ensure that water drips away from the structure.

6.6.7. Rail sections shall be joined with complete joint penetration (CJP) welds according to a welding procedure approved by the rail manufacturer and the Engineer. After joining, the welds shall be ground smooth within tolerances of the original crane rail section. The rail joint should not be detectable after grinding, including over grinding.

6.6.8. All welded rail joints shall be inspected by 100% UT.

6.6.9. Rail joints shall be staggered to ensure no two (2) or more trolley wheels cross a joint simultaneously.

6.6.10. Drilled holes in the Crane structure are prohibited for any part of the trolley rail system or installation.

6.7. Gantry Travel System

6.7.1. The gantry travel system shall consist of a load equalizer system and gantry travel drive system.

6.7.2. The equalizer system shall be as described in Section 7 and 6.17.

6.7.3. The Crane shall have sixteen (16) tires mounted on eight (8) pivoted wheel assembles with two (2) wheels each.

6.7.4. Wheel yokes shall be single sided for easy maintenance access.

6.7.5. 50% of the gantry wheels at each corner shall be driven.

6.7.6. Drive wheels shall be direct drive. A drive chain, open gearing, or similar design is not acceptable.

6.7.7. Drive motors shall be sized for traveling up the maximum grade into the maximum operating wind with maximum rated load.

6.7.8. The gantry travel system shall be equipped with electromagnetic disc brakes.

6.7.9. Motors, gearboxes, and brakes shall be located to prevent damage in a collision.

6.7.10. Wheel turning shall be by electric power to enable the wheels to rotate as required for cross travel mode and carousel mode and to be turned for out of service parking.

6.7.11. The gantry system shall be designed such that neither damage to the Crane nor injury to personnel occurs in the event of a tire failure or flat tire.

6.7.12. Wheels & Tires

6.7.12.1. Tires shall be heavy duty rubber tires mounted on tubeless rims.

6.7.12.2. Each wheel shall have jacking pads to allow the tire to be lifted clear of the ground for maintenance.

6.7.12.3. Wheel guards shall be provided to protect personnel from injury due to the moving Crane.

6.7.12.4. Jacking pads shall be provided to allow jacking of each corner of the Crane for wheel assembly removal.

6.8. Tie Down Devices

6.8.1. Gantry tie down devices shall be provided at each corner of the Crane to secure the Crane for wind speeds higher than the maximum operating wind speed.

6.8.2. The design of the gantry tie down locations and details shall be coordinated with the Engineer. The facility is new construction and the tie-down connections along the runways will be designed in concert with the Crane design.

6.9. Brakes

6.9.1. General

6.9.1.1. All brakes shall be spring applied safety brakes provided by a manufacturer with sales and support local to the Board's facility.

6.9.2. Main Hoist

6.9.2.1. The main hoist brake shall be self-adjusting disc brake which is spring applied.

6.9.2.2. The brake capacity shall be sized for 160% of the rated load torque.

6.9.3. Trolley

6.9.3.1. The trolley brake(s) shall be self-adjusting disc brake which is spring applied.

6.9.3.2. The brake capacity shall be sized to stop the trolley traveling at full speed with the maximum operating wind and full rated load.

6.9.4. Gantry

6.9.4.1. The gantry travel brakes shall be sized for the greater of:

6.9.4.1.1. 175% of the torque caused by the maximum operating wind speed acting in the most adverse direction.

6.9.4.1.2. 110% of the torque caused by the maximum microburst wind speed acting in the most adverse direction.

6.9.4.1.3. Gantry wheel traction calculations shall be provided with the brake sizing calculations.

6.10. Couplings

6.10.1. All couplings for the main hoist, trolley travel, and gantry travel systems shall have the following minimum safety factors:

Load Case	Durability Rating	Breaking Strength
(LS + LLE) x γm	2.0	5.0

6.11. Sheaves

6.11.1. Sheaves for wire ropes shall have a pitch diameter to wire rope diameter ratio of 30:1.

6.11.2. Sheaves shall be machined from rolled or forged steel.

6.11.3. Sheave profiles shall be per DIN 15063.

6.11.4. Sheave grooves shall a minimum of 34 HRC to a depth of 4mm.

6.11.5. Sheaves shall be provided with a minimum of two (2) holes for handling.

6.11.6. Sheave guards shall be provided to:

6.11.6.1. Prevent personnel from injury due to running ropes and sheaves.

6.11.6.2. Prevent wire rope from leaving the sheave in any condition.

6.11.7. Sheave guards shall be designed for a maximum 2mm gap between the sheave and the guard in sufficient locations to prevent wire rope from leaving the sheave. As a minimum, the 2mm tolerance must be provided at the entrance and exit of the cable to the sheave.

6.11.8. Sheave guards shall be removable for cleaning and maintenance and shall not require rope removal/unreeving. Fixed sheaves will be accepted where maintainability is not restricted by a fixed guard.

6.11.9. All Sheaves and bearings within a system, and designed for the same wire rope diameter, shall be interchangeable regardless of location and function.

6.11.10. Sheave assemblies shall be designed so that the entire assembly (sheave, bearing, and shaft (when applicable)) can be removed as a unit.

6.11.11. Fleeting sheaves are prohibited.

6.11.12. Sheaves shall be designed to accept metric or English equivalent rope sizes.

6.12. Drums

6.12.1. Rope drums driven by base mounted gear reducers shall be directly connected to the low speed output shaft of the reducer by a low speed coupling (6.10).

6.12.2. The idler end of all rope drums shall be supported by a self-aligning, anti-friction double row spherical roller bearing mounted in a two piece pillow block split horizontally on the bearing centerline.

6.12.3. Drums shall be fabricated steel with a stub shaft with double end diaphragms. The inside diaphragm shall be provided with access holes.

6.12.4. Ropes shall be spooled in one layer with three (3) unclamped full wraps remaining in grooves when the rope is payed out to its maximum extent (over travel).

6.12.5. Three (3) empty grooves shall remain on the drums when the spreader is at the maximum hoist over travel with a minimum of one (1) full wrap remaining to account for rope stretch. If additional wraps are required for rope stretch, additional empty grooves shall be provided.

6.12.6. Dead ends of rope shall be clamped on two consecutive grooves with independent clamps that only clamp one rope. Rope clamp bolts shall not be threaded into the drum shell.

6.12.7. The minimum pitch diameter of the drums shall be 25:1, based on the selected rope diameter.

6.12.8. Drum shell material shall be 345MPa (50 ksi) minimum yield strength with a finished rope groove hardness of 170 BHN.

6.12.9. Rope grooves shall be machined with a continuous groove profile with a slight radius on the groove edges to prevent sharp edges.

6.12.10. The minimum groove depth shall be 38% of the rope diameter and the minimum net thickness under the grooves shall be equal to the rope diameter.

6.12.11. All drums shall have flanges on each end which are a minimum of 30mm thick and have an outside diameter that is 125mm greater than the drum pitch diameter.

6.12.12. Drum shall be statically balanced (with wire rope clamps installed).

6.12.13. Removable stainless steel drip pans shall be provided to catch grease or oil from the wire rope unless the trolley structure is flat and solid and able to catch grease/oil.

6.13. Reeving

6.13.1. Wire rope is a consumable part of crane operations and replacement costs are to be minimized while still meeting the minimum design life requirements. As such, careful consideration shall be given to reeving, rope construction, rope grade, etc.

6.13.2. Premium wire rope construction, galvanized ropes, high strength ropes, and compacted strand ropes are prohibited unless required for the application in which case a deviation specifically requested by the Contractor must be approved in writing by the Engineer.

6.13.3. Wire ropes selection shall be designed for the application of this Crane for running drums & sheaves and shall be Extra Improved Plow Steel (XIPS) Independent Wire Rope Core (IWRC) Regular Right Hand Lay (RRL) 6x37 construction.

6.13.4. Ropes shall be pressure lubricated and free of rust (excluding outside surface) for the design life of the rope.

6.13.5. Wire rope shall have a minimum safety factor, based on the lesser of the American Iron and Steel Institute (AISI) Wire Rope User's Manual, latest edition breaking strengths or manufacturer's published breaking strength, as follows:

Description	Minimum Safety Factor
Main Hoist - Rated Load – Concentric	6.0
Main Hoist – Rated Load – Eccentric	4.0
Exceptional Rated Load – Eccentric	TBD

6.13.6. Each wire rope shall be supplied with complete testing certification.

6.13.7. Reverse bends of the wire rope are strictly prohibited except at the drum.

6.13.8. Fleet angles

6.13.8.1. Fleet angles exceeding 0.15° are only permitted where the Engineer determines it is absolutely necessary for design, such as between the drums and first sheaves and between the trolley and lifting device.

6.13.8.2. The maximum fleet angles, where approved, shall meet the following criteria:

Description	Maximum Fleet Angle
Wire rope to drums to the axis of grooving at the tangent point	2.5°
To sheave where the fleet angle does not pass through 0° at the midpoint of travel	2.5°
To sheaves where the fleet angle range is equal about 0° and passes through 0° at the midpoint of travel	3.0°
Between trolley & headblock within 3m of highest position	3.0°
Between trolley & headblock at max height	3.5°

6.13.8.3. Auxiliary sheaves shall be provided when any sheave is mounted more than 10° from the vertical plane. These auxiliary sheaves shall have a pitch diameter of at least 10:1 and shall maintain contact with the rope at all times.

6.13.8.4. Fleeting sheaves are strictly prohibited.

6.13.9. Either solid thimbles or open wedge sockets, both with wire rope clips shall be used for rope terminations

6.13.10. Replaceable slap blocks of hard wood or UHMW material shall be used to prevent bouncing, non-running wire rope from damaging other components or from prematurely wearing the rope.

6.13.11. Rollers made of a stack/row of anti-friction bearings separated by thrust washers shall be provided to prevent running wire rope from coming into contact with any obstruction. These rollers shall be of minimum length and the design concept is subject to the Board's or Engineer's approval.

6.13.12. In lieu of the rollers design requirement of 6.13.11, rollers made up of anti-friction bearings and seals may be considered by the Engineer on a selective basis when the Engineer agrees that the Contractor cannot install the required roller design. The alternative roller design shall meet the following requirements:

6.13.12.1. The roller shall have a minimum life of 5,000 hours or two (2) years, whichever is greater.

6.13.12.2. The rollers shall be easily replaceable by one (1) maintenance person.

6.13.12.3. The roller shall be able to have wear components easily replaced in place and have the assembly removed as a single unit (bearing, shaft, seal, roller, etc).

6.13.12.4. Roller designs consisting of steel rollers, rollers with UHMW discs, etc. will be considered subject to the actual life requirement.

6.13.12.5. Final roller design is subject to approval by the Engineer.

6.13.13. An active or passive anti-sway system shall be provided.

6.14. Gearing

6.14.1. General

6.14.1.1. Gears and gear reducers shall be supplied from a company with at least 10 years of experience in the supply of gears and gear reducers for container handling crane applications and who is in regular production of gear reducers.

6.14.1.2. The gear reducer supplier shall provide a certified/signed application approval letter which confirms that the gear reducers meet the requirements of these Specifications.

6.14.1.3. Open gearing as well and chains and sprockets are prohibited.

6.14.2. Cases/Housing

6.14.2.1. Gear cases shall be horizontally base mounted, totally enclosed oil-bath cases that are flanged and horizontally split on the shaft centerline.

6.14.2.2. Gear cases shall be fabricated or cast steel.

6.14.2.3. Gantry drive reducers may be shaft mounted but must be easily removable.

6.14.2.4. All gear cases shall be equipped with the following features/components:

6.14.2.4.1. Dryer type vents

6.14.2.4.2. Weatherproof vent caps

6.14.2.4.3. Oil level dip stick and/or sight gages

6.14.2.4.4. Easily accessible oil drain with locking valve and magnetic plug.

6.14.2.4.5. Large (75%-100% gear face width) removable inspection covers with gaskets which allow for direct visual inspection of the full face width of all gear meshes for main hoist gearboxes.

6.14.2.4.6. Jack screws, lifting lugs, eyebolts, alignment dowels for maintenance disassembly and reassembly.

6.14.2.5. The gear case halves shall be joined by metal to metal contact without gaskets and produce an oil tight seal.

6.14.2.6. Gear cases shall be designed to prevent distortion from loads and deflections of the Crane structure under all operating and stowed conditions.

6.14.2.7. All mating gears shall be for tooth contact in accordance with ISO/TR 10064-4.

6.14.3. Lubrication and Cooling

6.14.3.1. Shaft bearings shall be continuously lubricated with oil during operation (direct splash lubrication is acceptable) and shall be mounted in troughs which maintain partial submersions of the bearing when not in operation. Gearboxes shall be designed to maintain a surface temperature of the gearbox less than 60°C (140°F).

6.14.3.2. Lubricants used for gearing shall be in accordance with ANSI/AGMA 9005-E02 or ANSI/AGMA 9005-D94.

6.14.3.3. Oil coolers and gearbox forced ventilation is prohibited.

6.14.3.4. Oil samples shall be taken from each gear reducer at commissioning. The results of each oil sample shall be compared with a clean oil base test sample and submitted to the Engineer for review.

6.14.4. Gears & Ratings

6.14.4.1. All gears shall be carburized, hardened, single helical gears of ISO grade 6 or better with an overlap ratio of 1.5 or greater.

6.14.4.2. Gear teeth shall be cut with protuberance hobs and finished by grinding with tip chamfers, edge rounds, and end rounds with a tooth surface finish of 0.8 microns.

6.14.4.3. Undercut teeth, grinding steps in tooth flanks, grinding in root fillets and grinding burns are prohibited.

6.14.4.4. Gears shall be rated for strength and durability in accordance with the latest edition of ANSI/AGMA 2101-D04 or ANSI/AGMA 2003-B97, ISO 6336 (SFS 4790) with design loads as required per F.E.M.

6.14.4.5. Allowable stresses shall be calculated in accordance with AGMA with the following service factors:

Description		Service Factor
Main Hoist & Trolley	Strength	2.0
	Durability	1.1
Gantry	Strength	1.5
	Durability	1.0

6.15. Hydraulics

6.15.1. No hydraulic systems shall be utilized on the Crane or any of its components except for as approved on the spreader.

6.16. Lubrication

6.16.1. The Crane and its components shall be designed to minimize lubrication. Required lubrication intervals shall not exceed twice per year for any component unless approved by the Engineer.

6.16.2. Oil lubrication shall be provided for all gearing.

6.16.3. Lubrication of all components except gearing shall be by high pressure grease gun with standard single type and size industrial button head fitting made of brass or stainless steel. Metric size button head fittings are prohibited.

6.16.4. Grease required for lubrication shall be of a single type. Any exception to this requirement shall be requested by the Contractor in writing and will be subject to approval of the Engineer.

6.16.5. Bearings for motors or gearbox shaft seals (if approved) requiring periodic lubrication shall have fittings not compatible with the standard button head fittings used throughout the Crane.

6.16.6. Lubrication fittings shall be:

6.16.6.1. Easily accessible from walkways and maintenance platforms

6.16.6.2. Grouped in manifold blocks to the greatest extent possible

6.16.6.3. Remotely piped to a manifold block. Piping shall not exceed 3m for any given lubrication point.

6.16.7. Each lubrication fitting and manifold block shall be 316 stainless steel and permanently identified with an engraved stainless steel label.

6.16.8. All pins, whether they are rotating or stationary, mechanical or structural shall be lubricated. Pins at main structural diagonals and horizontal rods are excluded from this requirement.

6.16.9. All lubrication piping shall be 316 stainless steel. Pipes must be routed purposefully to minimize bends in the pipe, avoid areas that are subject to damage, and be installed in a professional, workmanlike manner. Excessively bent or poorly installed piping shall be replaced at the Contractor's expense.

6.16.10. The use of flexible tubing for lubrication lines shall be limited only to areas of relative movement. The location, length, and type of flexible tubing is subject to the Engineer's approval.

6.16.11. An engraved stainless steel lubrication chart shall be provided on the crane to identify the lubrication location and type of lubrication for all lubrication points.

6.17. Shafts and Pins

6.17.1. Shaft and pins include all rotating or stationary shafts and pins including equalizer pins, backstay pins, other structural pins, etc. unless a specific component is defined in another section of these Specifications.

6.17.2. Pins with steel to steel contact shall be 50HB greater than its housing.

6.17.3. Shafts and pins shall be secured in position with keeper plates installed in annular grooves. Keeper plates shall not be used to prevent rotation.

6.17.4. Shaft and pins shall be designed such that non-bearing areas of the shafts and pins have a smaller diameter (approximately 6mm less) than bearing areas.

6.17.5. Non-bearing areas of shafts and pins shall be painted in accordance with the coating requirements of these Specifications. Bearing areas and machined surfaces of shafts and pins shall be protected by other corrosion prevention measures.

6.17.6. Areas of lip seal contact on shafts shall be polished.

6.17.7. All shafts and pins shall have annular grooves machined at the midpoint of bearing areas and through shaft lubrication means.

6.17.8. All shafts and pins less than 35mm shall be 316 stainless steel.

6.17.9. Shafts and pins shall be provided with threaded holes on its end for inserting a jack bolt or eye bolt to assist in removal.

6.17.10. The basic allowable bearing stress for pins shall be:

Description	Allowable Stress
Rotating pins	0.4 x Fy
Non-rotating pins	0.8 x Fy
Gantry pins and headblock pins	0.25 x Fy (operating) 0.40 x Fy (other combinations)

6.17.11. Loads distribution through ear plates shall consider that 70% of the load is transferred through one side (ear plate, etc.).

6.18. Bearings, Bushings, and Seals

6.18.1. Anti-friction, metric dimension bearings part of regular production by approved manufacturers and readily available in the Board's vicinity shall be selected.

6.18.2. All bearings within a system shall be of identical size and design.

6.18.3. The minimum B-10 life rating of all bearings shall be based on FEM requirements of these Specifications.

6.18.4. The basic static capacity of any bearing shall not be exceeded under any condition.

6.18.5. Pillow blocks (split bearings) shall be split on the bearing centerline and doweled.

6.18.6. Cast iron pillow blocks and bearing cartridges are prohibited.

6.18.7. Bearings shall be sealed by caps and/or spring loaded lip-garter seals and provided with pressure grease lubrication in accordance with 6.16.

6.18.8. Bearing seals shall be metric dimension seals part of regular production by approved manufacturers and readily available in the Board's vicinity

6.18.9. Running surfaces for seals shall have a surface finish of 0.8 microns or finer.

6.18.10. Bearing housings shall have removable caps for inspection of the shafts by NDT.

6.18.11. All bearings shall be trapped on the shaft and against end plates via spacers or thrust washers. Lateral displacement of the bearing relative to the shaft or the housing is prohibited.

6.18.12. Sealed bearings (non-re-greasing) for auxiliary systems such as wire rope rollers and festoon rollers may be considered and are subject to approval by the Engineer.

6.18.13. Bushings shall be no less than 3mm thick and have a thickness to diameter ratio greater than .075:1, rounded up in intervals of 3mm. Thin wall bushings are prohibited.

6.18.14. All bearings, bushings and seals shall be easily replaceable.

6.19. Equipment Mounting & Fasteners

6.19.1. Where equipment is grouped together for a common system, a rigid base frame with machined support plates shall be provided. The machined support plates shall be no less than 25mm wider than the equipment mounting base on all sides.

6.19.2. Equipment, except gear reducers, shall be mounted with a single 3mm-6mm support shim for future re-alignment.

6.19.3. Full width stainless steel alignment shims shall be used for final alignment. No more than four (4) shims shall be used on any one pad.

6.19.4. Adjustable bolts with locking nut or shear bars shall be provided to maintain initial alignment in each direction at each corner. The method will be approved by the Engineer for each application.

6.19.5. Motors, reducers, brakes, pillow blocks, and other machinery elements shall be installed with tapered dowel pins installed after final alignment except flange mounted motors.

6.19.6. Wheel and sheave mountings shall be designed so that the assemblies can be replaced as a unit.

6.19.7. All equipment shall be accessible for maintenance with 760mm clearance around equipment, where possible.

6.19.8. All fasteners (non-structural) shall be secured with locking devices. The locking device is subject to approval by the Engineer.

6.19.9. Fastener groups shall be wired together with stainless steel wire. Locknuts, lock washers, set screws, and snap rings shall not be used on rotating equipment and only used elsewhere if a specific written request is approved by the Engineer. Alternative locking methods may be approved on a selective basis.

6.19.10. Threadlockers and thread sealants in either liquid or semi-solid formulations (Loctite) shall not be used on fastening.

6.19.11. Threaded fasteners shall not be subject to fluctuating tensile stresses.

6.20. Buffers & Bumpers

6.20.1. Pneumatic energy absorption buffers shall be provided, one (1) per corner on the trolley sized in accordance with F.E.M. and AISE Technical Publication #6.

6.20.2. The buffers may either be mounted on the trolley or on the Crane main structure at the end of trolley travel.

6.20.3. Alternative designs will be accepted subject to verification by the Engineer that the proposed design can limit the deceleration rate and impact forces to those equivalent of pneumatic energy absorption buffers.

7. Structural Specifications

7.1. General

7.1.1. The Crane structural configuration and design criteria shall comply with the dimensional and technical requirements of these Specifications.

7.1.2. The structural design shall consider the most adverse loading conditions at rated capacity and speed based upon simultaneous main functions operations, environmental conditions, grade, and other parameters included in these Specifications.

7.1.3. The structural design of the Crane shall consider the Crane stiffness and relative deflection of the main structural components. The design shall minimize the sway in the trolley and gantry travel directions as well as the effects on the operator under normal container handling operations and E-Stop conditions.

7.1.4. The structural design shall be in accordance with F.E.M 1.001 3rd Edition requirements.

7.1.5. The structural design shall consider a 20 year useful life based upon the duty cycle requirement of these Specifications.

7.1.6. Trolley and gantry structures shall be designed based upon the same criteria as the main structure.

7.2. Load Description

7.2.1. The main frame, girder, gantry and trolley structural component design shall consider the following F.E.M. Structural Classification:

Load	Symbol	Description
Dead Load	DL	The load of the Crane including all structural, mechanical, electrical components, access platforms, stairs, ladders and other secondary structures, excluding the trolley, lifting system, and lifted load.
Trolley Load	TL	The load of the trolley structure with all mechanical, electrical components, ropes, access platforms, ladders, and other secondary structures
Lift System	LS	The load which hangs from the trolley including the headblock, spreader, and other attachments, but excluding the lifted load.
Lifted Load (Rated Load, Safe Working Load)	LL	The maximum rated lifting capacity of the Crane under Spreader
Lifted Load Eccentric	LLE	The lifted load with the lifted load weight distribution not symmetrical to the geometrical center of the lift system in accordance with Section 3 for single or twin lifts.
Wind Load Operating	WLO	The load due to wind pressure at the maximum operating wind speed condition as specified in 3.6.3.
Wind Load Stowed	WLS	The load due to wind pressure at the maximum out of service (stowed) wind speed condition as specified in 3.6.3.
Collision Trolley Load	COLT	The loads when the trolley collides with trolley end stops while traveling at full speed.

Collision Gantry Load	COLG	The loads when the gantry collides with gantry end stops, adjacent Crane, or other obstruction while traveling at full speed.
Lateral Trolley Load	LATT	The loads due to acceleration or deceleration of the Crane gantry system. The loads shall be determined in accordance with F.E.M., but shall be no less than: ∥ Travel Direction ≥ 0.1(DL+TL) + 0.05(LL) ⊥ Travel Direction ≥ 0.05(DL+TL) + 0.025 (LL)
Lateral Gantry Load	LATG	The loads due to acceleration or deceleration of the trolley system. The loads shall be determined in accordance with F.E.M., but shall be no less than: ∥ Travel Direction ≥ 0.1(TL) + 0.025(LS+LL) ⊥ Travel Direction ≥ 0.025(TL) + 0.005(LS+LL)
Skew Trolley Load	SKW	The loads due to trolley wheels rolling on the rail. The loads act normal to the rail and skew the structure. The horizontal loads shall be calculated based on the F.E.M. coefficient based on rail span to wheel base ratio.
Stall Torque Load	STL	The load due to stalling any motor on the Crane. Hoist stall shall consider all loads taken to one set of ropes.
Earthquake Load Operating	EQO	The loads due to seismic events (earthquake) during operation. The load magnitude shall be determined by local codes at the Board's facility, but shall be no less than 20% of dead load and trolley load.
Earthquake Load Stowed	EQS	The loads due to seismic events (earthquake) during out of service conditions. The load magnitude shall be determined by local codes at the Board's facility, but shall be no less than 20% of dead load and trolley load.

7.3. Load Combinations

7.3.1. The design of the Crane shall consider all possible loading combinations with simultaneous operations and the most adverse loads in accordance with F.E.M.

7.4. Analysis and Calculations

7.4.1. The Crane structural analysis shall be performed and thoroughly reviewed by a qualified professional engineer. This engineer does not need to be independent of the Contractor's design team.

7.4.2. The criteria specified herein establish the minimum acceptable standards. It shall be the responsibility of the Contractor's engineer to identify if any of the standards specified are not adequate for the application and provide recommendations to the Board of the more stringent design criteria.

7.4.3. All calculations and drawings must be reviewed and signed by the responsible structural engineer and submitted to the Board's Engineer for review.

7.4.4. The Contractor's structural engineer shall visually inspect the complete structure and as-built configuration of the Crane to verify completeness and compliance with this specification and applicable standards.

7.4.5. The structural analysis methods and finite element analysis (FEA) shall accurately model the Crane main structural components, welded, pin or bolted connections, attachment of secondary members, local releases and/or restraints and global boundary conditions.

7.5. Applied Loads

7.5.1. The operating and out-of-service wind pressures shall be as defined in these Specifications and applied in the most adverse direction using F.E.M. shape coefficients.

7.5.2. The magnitude and load path of all dead loads, wind loads, rope loads, machinery loads, etc. shall be accurately modeled in the FEA.

7.5.3. The calculations shall include a free body of the applied loads.

7.6. Load Combination Factors and Allowable Stresses

7.6.1. The dynamic coefficient (impact factor) values to be applied per F.E.M. shall be 1.3.

7.6.2. The amplifying coefficient to be applied per F.E.M shall be 1.2.

7.6.3. The allowable stress for operating, overload, stowed and earthquake conditions shall be per F.E.M. as follows:

Case of Loading	Allowable Stress	Description
I	Fy / 1.5	Operating w/o wind
II	Fy / 1.33	Operating w/ wind
III	Fy / 1.1	Out of Service

7.7. Buckling

7.7.1. The Crane shall be designed against buckling in accordance with F.E.M.

7.8. Deflection Criteria

7.8.1. Deflection of the Crane structure must be limited in such a way that there is no influence on travelling or unequal wear of the tires.

7.8.2. Deflection of the main structure or machinery support brackets shall not impair the performance or design life of the relevant mechanism.

7.9. Natural Frequency

7.9.1. The natural frequency shall be greater than 0.8 Hz in the trolley travel direction and greater than 0.6 Hz in the gantry travel direction.

7.9.2. The natural frequency shall be verified during testing and commissioning of the Crane.

7.10. Fatigue Design

7.10.1. The structural design fatigue load shall be as defined in 4.5 for continuous operation.

7.10.2. The fatigue design of the main structural components shall consider F.E.M. 1.001 3rd edition K3 classification. The Crane design shall not include fatigue details with stress concentration above K3 Classification. Any component fatigue design classification lower than K3 in the analysis will be subject to approval by the Engineer.

7.10.3. The Contractor' structural engineer shall inspect the completed structure to verify that the structural fabrication details and method of attachment of components or brackets to the structure are in compliance with this specification and the structural fatigue analysis classifications of members.

7.10.4. Fatigue design shall consider the load spectrum provided in 4.3.

7.11. Bolted, Welded and Pinned Connections

7.11.1. The strength of connections shall be greater than the net strength of the connected member.

7.11.2. Connections shall be welded to the maximum extent possible. The use of bolted joints shall be avoided, but may be approved by the Engineer for specific cases.

7.11.3. Bolted joints shall use ASTM A325 or A490 bolts designed to meet the requirements for slip critical joints.

7.11.4. Connections combining welds and bolts are prohibited.

7.11.5. The faying surfaces of all bolted connections shall be machined and the mating plates matched drilled. The edges of the bolted connection mating plates shall be sealed with silicone caulk after final tightening.

7.11.6. All bolts shall be protected from corrosion:

7.11.6.1. All bolts, nuts, washers, pins, and other fasteners 12mm diameter or less shall be 316 stainless steel.

7.11.6.2. High strength structural bolts shall be coated with Dacromet, not hot-dip galvanized.

7.11.6.3. All other bolted assemblies shall be hot-dip galvanized.

7.11.7. All bolt holes shall be machine drilled. Torch/plasma cut (burned) holes are prohibited.

7.11.8. Structural flat washers and taper steel washers shall be used in conjunction with proper length bolts to ensure that the nut does not bear on the shank of the bolt when tightened. A minimum of 2 full threads shall protrude beyond all tightened nuts.

7.11.9. All pinned connections shall be designed such that the transferred load may be unequal, with 70% of the load taken to one side.

7.12. Wheel (Tire) Loads

7.12.1. The maximum gantry runway and tire loads specified in3.6.6 shall not be exceeded under any operating or stowed condition.

7.12.2. Wheel loading calculations shall be performed for all operating and stowed load cases and combinations in accordance with these Specifications and F.E.M.

7.12.3. For the purpose of calculating wheel loads, not component sizing, the Contractor may use the results of a wind tunnel analysis performed in accordance with Section 7.14.

7.12.4. The Crane configuration shall be designed to provide wheel loads that are near symmetrical on both sides of the Crane with the load centered on the Crane. Ideally, the diesel generator shall be on the same side of the Crane as the cable reel, opposite of the electrical house and trolley parked position.

7.12.5. The as-built tire loads shall be verified after final assembly of each Crane per 22.11

7.13. Stability Analysis

7.13.1. The Crane shall be stable in all operating and stowed conditions and shall meet the stability safety factors and leg lift criteria as follows:

Description	ST1	ST2	ST3	ST4	ST5	ST6	ST7
Dead Load	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Trolley Load	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Lift System Load	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Lifted Load	1.0	1.0	1.0	1.0	1.0	1.0	
Lateral Trolley Load	1.0	1.0	1.5	1.0			
Lateral Gantry Load	1.0	1.0	1.0	1.5			
Wind Load Operating	1.0	1.5	1.0	1.0	1.0	1.0	
Wind Load Stowed							1.0
Stall Load							
Collision Load (gantry or trolley)					1.15		
Seismic Load						1.15	
Allowable # of legs lifting	0	0	0	0	1	1	0[1]
Required Stability Ratio	1.05	1.0	1.0	1.0	-	-	1.2

[1] Tie Downs must be installed and no legs shall lift. Tie downs shall take all uplift.

7.14. Wind Tunnel Analysis

7.14.1. The Contractor shall make a suitable scale model of the Crane which is to be tested at an approved laboratory with boundary layer wind tunnel capabilities.

7.14.2. The test results shall be used for the following design calculations (all other calculations shall use F.E.M. wind load coefficients):

7.14.2.1. Wind loads

7.14.2.2. Wheel loading (not component sizing)

7.14.2.3. Stability

7.14.3. The model shall include surfaces for access ladders, stairs, platforms, and other Crane components such that the model is aerodynamically equivalent to the Crane design.

7.14.4. The wind tunnel analysis shall be conducted with a 45’ high-cube container (9’-6” high).

7.14.5. The test shall be performed for operating conditions with and without load as well as stowed conditions.

7.14.6. The test shall be performed with the model positioned between 0° and 360° in increments of 15° or less.

7.14.7. Prorating of wind tunnel results based on similar crane configurations is prohibited.

7.14.8. The wind tunnel testing requirement can be waived if:

7.14.8.1. The Contractor adheres to strict compliance of the FEM shape coefficients, or

7.14.8.2. The Contractor can provide wind tunnel test results of a near identical Crane configuration without the need for prorating or scaling of forces, wind speed, wind pressure, etc.

7.14.9. After completion of testing, the Crane model shall be painted to match the color/logo scheme for the Crane and delivered to the Board.

7.15. Seismic Analysis

7.15.1. Seismic analysis shall be performed where the earthquake loads (EQO & EQS) exceed the minimum criteria specified in 7.2.

7.16. Transportation Analysis

7.16.1. The requirements of this Section shall be submitted for review at least 120 days prior to shipment for either fully assembled delivery or subassembly shipment.

7.16.2. Fully Assembled Delivery

7.16.2.1. For fully assembled delivery, an analysis shall be performed for the loading, sea-fastening, voyage (motion study, transportation route, etc.), and offload of the Cranes.

7.16.2.2. A voyage/stowage plan shall be provided for shipment of the Crane and include, as a minimum:

7.16.2.2.1. Vessel arrangement with cargo on board

7.16.2.2.2. Sea fastening details

7.16.2.2.3. Arrival berthing details

7.16.2.2.4. Offloading plan, details, and schedule

7.16.3. Subassembly Delivery

7.16.3.1. For subassembly shipment of the Crane, an analysis shall be performed only for the offload of the subassemblies and transportation across the Board's facility.

7.16.3.2. A voyage/stowage plan shall be provided for shipment of the Crane subassemblies and include, as a minimum

7.16.3.2.1. Vessel arrangement with cargo on board identifying components stored above and below deck

7.16.3.2.2. Packing details of subassemblies and components

7.16.3.2.3. Arrival berthing details

7.16.3.2.4. Offloading plan, details, and schedule

8. Electrical Specifications

8.1. General

8.1.1. The Contractor shall provide all equipment, controls, wiring, terminations, labor, installation, testing, certification, etc. required for safe and efficient complete operation and minimal maintenance of the Crane and all mechanical and electrical systems.

8.1.2. All equipment used on the Crane shall be of current design and designed for the heavy shock and vibration conditions of the Crane as well as the all-weather marine environment.

8.1.3. All components, fasteners, mounting brackets, attachments, etc. shall be 316 stainless steel unless specifically approved in writing by the Engineer. Review of a submittal where a non-316 stainless steel component is identified does not satisfy the requirement of the Engineer's approval.

8.1.4. Units requiring removal for maintenance shall be designed as a modular or "plug in" unit/connection.

8.2. Main Power Supply

8.2.1. Main power drives for hoist, trolley, and gantry shall be as specified in 8.38.

8.2.2. Main power shall be supplied by an approved main power cable in accordance with 8.4 collected on a Crane mounted motor driven cable reel in accordance with 8.3

8.2.3. Main power shall have a backup/emergency power supply from a permanently mounted diesel generator in accordance with 8.5. A removable diesel genset may be considered; however, each crane shall be provided with its own diesel genset, and the unit is mounted on top of the sill beam.

8.3. Gantry Travel Cable Reel

8.3.1. The gantry cable reel shall be installed on the main sill beam opposite of the main personnel access and truck lane.

8.3.2. The cable reel shall be a powered monospiral reel with sufficient spooling capacity for the gantry travel parameters specified in 3.6.7 plus two dead wraps at the extreme limits of travel and two empty wraps available at the feed point.

8.3.3. The cable reel device shall be controlled by a variable frequency AC inverter and shall consist of a motor(s), brake(s), and gear reducer.

8.3.4. The drive shall be capable of being stalled continuously without overheating.

8.3.5. The drive shall provide the required torque and speed necessary to pick up the cable from the ground and prevent a slack cable condition for the full range of gantry speeds and acceleration.

8.3.6. Spring set brake(s) shall be provided to maintain the reel position when the drive is not energized.

8.3.7. The cable reel shall be equipped with a redundant slip ring brushes to allow continued operation in the event of a failure of a single slip ring or brush.

8.3.8. The slip ring enclosure shall have transparent, UV resistant inspection plates of no less than 200mm x 200mm or 250mm diameter, but shall be large enough for full visibility of the slip ring.

8.3.9. The cable reel device shall be compatible for use with a gantry cable with fiber optics cores.

8.3.10. The cable reel device shall be provided with device control, monitoring, and protection devices to ensure safe, reliable, and proper operation which shall be integrated with the Crane control system.

8.3.11. Rotary cam limit switches shall be provided to accurately and reliably indicate:

8.3.11.1. End of travel slow down (both directions)

8.3.11.2. End of travel stop (both directions)

8.3.11.3. Feed point (from both directions)

8.3.12. The drive shall be interlocked with the gantry drive such that:

8.3.12.1. The cable reel drive and gantry brakes simultaneously energize/de-energize.

8.3.12.2. The gantry drive de-energizes when the cable reel drive de-energizes.

8.3.13. Manual operating stations shall be provided at the cable reel drive panel and at the ground level near the cable diverter.

8.3.14. A cable diverter shall be provided at the ground level for proper laying and retrieval of the cable. Fairleads/guide rollers and other such devices shall be provided as required by the cable reel manufacturer. All components shall be supplied by the cable reel supplier.

8.3.15. The cable reel shall meet grounding requirements in accordance with local codes and standards

8.3.16. The cable and cable reel shall be from a single supplier.

8.4. Gantry Travel Cable

8.4.1. The main power trailing cable shall be rated for reeling applications for the required supply voltage and peak current for operation.

8.4.2. The voltage rating of the cable shall be equal to or greater than the supply voltage provided in 3.6.9.1.

8.4.3. The cable shall be provided with fiber optics with a minimum of six (6) cores.

8.4.4. The cable manufacturer, cable type / model number, and voltage rating shall be stamped on the cable jacket.

8.4.5. The required cable length shall allow for the full length of travel plus additional cable length for the required dead wraps on the reel as specified in 8.3 and three (3) dead wraps around a stress relief drum and routing to the termination point.

8.4.6. The cable shall meet grounding requirements in accordance with local codes.

8.4.7. The Contractor is responsible for termination of the gantry travel cable to the Crane.

8.4.8. The Contractor is responsible for termination of the gantry travel cable at the Erection Site. The Contractor shall supply the cable with a power connection plug and receptacle. The Contractor shall mount and terminate the receptacle in an IP66 power terminal box at the Erection Site. The connection and disconnection of this plug shall be incorporated into the trapped key system per 8.7.

8.5. Maintenance Diesel Generator

8.5.1. A permanently mounted diesel generator shall be provided for maintenance purposes. A removable diesel generator will be considered provided that it can be mounted on the sill beam and meets all other requirements for the diesel generator.

8.5.2. The diesel engine shall be mounted on the same side of the Crane as the cable reel, opposite of the main access and truck lane.

8.5.3. The diesel generator shall be sized for the following operating conditions:

Operational Function	% Rated Speed
Gantry Travel	50%
Trolley Travel	20%
Main Hoist	20%

8.5.4. The intent of this requirement is to minimize the genset size to reduce maintenance, operation, procurement, and replacement costs.

8.5.5. All auxiliary functions shall maintain functionality under any operating condition.

8.5.6. The diesel generator shall be mounted on a rigid frame housing all components within a single enclosure.

8.5.7. The enclosure shall be a noise reducing, insulated unit with full width access door on both sides. The radiator end of the enclosure shall be provided with grill/louvers to ensure free flow of cooling air. The intent is to maximize access for maintainability. Alternate designs will be considered if sufficient maintenance access is provided.

8.5.8. The diesel engine shall be a 4-cycle water cooled engine with pusher fan and rated for generator use.

8.5.9. The diesel engine shall be fitted with a hand pump for oil changing and a hand pump for coolant filling.

8.5.10. The diesel engine shall include a governor limiting frequency variations less than 3%.

8.5.11. The fuel tank shall be incorporated into the design of the base frame and sized to provide two (2) hours of operation under highest demand.

8.5.12. The fuel tank shall include a locking fill port, drain plug, and level gauge. The drain plug shall be fitted with a ball valve or gate valve between the fuel tank and the plug.

8.5.13. The diesel generator unit noise level shall be less than 80 dBa measured at 1m from the enclosure with all doors closed.

8.5.14. Electrical convenience outlets shall be provided.

8.5.15. The diesel genset shall provide monitoring and protection for operation. A panel shall be provided for each system/function monitored & protected, with gauges and indicators for, as a minimum:

8.5.15.1. Engine overspeed

8.5.15.2. Oil pressure

8.5.15.3. Water temperature

8.5.15.4. Radiator water level

8.5.15.5. Voltage

8.5.15.6. Current

8.5.15.7. Operating Hours

8.6. Power Supply Transfer & Braking Resistance

8.6.1.1. Manual transfer of power supply (cable reel / diesel generator) shall be possible only from the diesel generator control panel.

8.6.1.2. Provisions shall be provided to ensure that the RTG does not exceed the cable reel travel distance unless the cable has been disconnected and is stored on the Crane. A plug in receptacle on the Crane is anticipated as a safety interlock.

8.6.1.3. The Crane shall be equipped with braking resistance in the DC intermediate circuit of the AFE, between the rectifier and inverter, in order to prevent electrical energy feeding back to the diesel generator.

8.6.1.4. Braking resistance should only be used when the power supply is from the diesel generator.

8.6.1.5. The Contractor shall ensure that the braking resistance functionality is properly interlocked with signals indicating the current power supply.

8.7. Trapped Key Interlock System

8.7.1. The Contractor shall provide a trapped key interlock system to restrict access and ensure safety MV components between the substation switchgear and the Crane MV components (MV slip ring, main transformer, and auxiliary transformer, etc.).

8.7.2. An engraved 316 stainless steel trapped key diagram shall be provided on the MV switchgear on the Crane.

8.7.3. The Contractor shall be responsible for all coordination of the trapped key interface with the substation.

8.7.4. The trapped key system shall be integrated into the plug and receptacle connection for the MV trailing cable.

8.8. Transformers

8.8.1. Medium voltage isolation transformers shall be installed on the Crane to step down the line voltage to the utilization voltage. Transformer circuit isolation shall be provided for all drives, i.e. hoist, trolley, gantry, and gantry cable reels, and the motor control center circuits. Two separate medium voltage transformers (main drive transformer and auxiliary transformer) shall be provided for this purpose. The auxiliary transformer may be fed from the secondary side of the main drive transformer.

8.8.2. The transformers shall be cast resin dry-type with a standard voltage secondary winding, compatible with the control and drive systems. Primary taps consisting of two 2.5 % taps above and below rated primary voltage shall be provided.

8.8.3. The core and coil shall be vacuum processed to ensure maximum penetration of insulating fluid into the coil insulation system. The final coating shall consist of 1-2 mils of epoxy varnish over the VPI impregnated system.

8.8.4. Transformer impedance shall be no more than two (2) percent. The impedance will be such that the total voltage drop through any transformer shall not exceed four (4) percent from no load to stall torque loading. The transformers shall be rated for operation with AC drives.

8.8.5. The transformer shall have electrostatic shields and windings and shall be properly braced for voltage and vibration stresses as well as system fault current. Coil winding materials shall not be brought out past the core for connection points. Flexible cable rated for the voltage levels, shall be used to connect from transformer taps to bus bar connection points. The use of bus bar shall be minimized to prevent cracking due to crane movement and flexing.

8.8.6. A “Power on” red LED indicator light shall be mounted on the door. The transformer shall be appropriately protected against human entry by a trapped key interlock on the door(s).

8.8.7. Insulation test rating shall 75 kV BIL. The primary windings are to be individually tested for partial discharge. Lightning arresters shall be provided with the transformer.

8.8.8. The transformer enclosure shall be designed for cooling by natural circulation. The effect of solar radiation shall be considered per IEEE Std C37.24. All air intakes and exhausts must be designed to prevent water ingress under rated and stowed wind conditions.

8.8.9. The transformer shall be equipped with over-temperature detection in the secondary windings for warning and shut-down, causing switching-off the crane breakers. Additional temperature detection shall be provided on the iron core of the drives transformer, forcing an immediate shut-down of the drives.

8.8.10. The main drive transformer shall be monitored for ground current. Two settings of ground fault will cause an alarm and shutdown. If a ground fault shutdown is detected, an operator alarm will activate and the crane hoist cycle in progress can complete unless a time delay setting has been exceeded. No further operation of the hoist with the spreader bar locked is allowed. The crane is allowed to move with unlocked spreader, and gantry to the stowed position.

8.8.11. The main drive transformer shall have insulation class F.

8.8.12. An auxiliary transformer shall be provided for auxiliary driver, controls, lighting, etc.

8.8.13. Transformer casing, enclosure, mounting hardware, etc. shall be 316 stainless steel.

8.9. Motors

8.9.1. All main drive motors shall be from the same manufacturer.

8.9.2. All main drive motors shall be AC squirrel cage motors.

8.9.3. All motors exposed to the atmosphere shall be IP55 rated.

8.9.4. Maximum motor speed shall be limited to 2000 rpm, except for main hoist motor(s) lifting less than the maximum rated load.

8.9.5. All motors 5kW or larger shall have anti-condensation heaters.

8.9.6. All motors shall have over-temperature protection and be monitored by the control system.

8.9.7. All motors shall be sized for in accordance with the design requirements of these Specifications for torque and thermal (duty cycle) ratings.

8.9.8. Where motor power requirements are within 20% of others, identical motors shall be selected for these motors, based on the size of the larger motor, and they shall be completely interchangeable (terminals, couplings, mounting, etc.)

8.9.9. Force ventilation is not preferred, but if approved, cooling air failure detection shall be provided.

8.10. Spreader Cable

8.10.1. The spreader cable shall be rated for the cable storing application for the required supply voltage and peak current for operation.

8.10.2. The voltage rating of the cable shall be equal to or greater than the supply voltage provided in 3.6.9.1.

8.10.3. The cable manufacturer, cable type / model number, and voltage rating shall be stamped on the cable jacket.

8.10.4. The required cable length shall allow for the full length of travel plus additional cable length for the required dead wraps around a stress relief drum and routing to the termination point. Excess cable shall be provided for making the termination. Alternatives to the stress relief drum design will be considered provided that the proposed solution provides equivalent protection, reliability, and durability of a stress relieved drum.

8.10.5. The cable shall meet grounding requirements in accordance with local codes and standards.

8.10.6. The Contractor is responsible for termination of the cable to both the Crane and the spreader.

8.11. Energy Chain

8.11.1. Power and control wiring to the trolley shall be by energy chain system.

8.11.2. The energy chain shall be installed to prevent damage from the Crane structure or the moving trolley under all circumstances and be protected from damage, lifting, failure in operating and stowed wind conditions.

8.11.3. Strain relief shall be provided with buffers for shock absorption of cables installed in the energy chain. Alternative methods of protecting the energy chain cable terminations on both ends may be approved provided that failure of the energy chain will not result in damage of these termination points.

8.11.4. Cable sizes installed in the energy chain shall be minimized.

8.11.5. A minimum of 10% spare cable cores shall be provided in the energy chain system.

8.11.6. All cables installed in the energy chain shall be designed for use in energy chains and installed in accordance with the cable manufacturer's instructions.

8.12. Protection of Electrical Systems

8.12.1. All control equipment shall be provided with under voltage, over voltage, thermal and instantaneous overload protection including appropriate lightning protection.

8.12.2. All master switches shall be required to return to the neutral/Off position for control power to be reset.

8.13. Grounding

8.13.1. All electrical equipment and motors shall be grounded by copper conductors sized, bonded, and installed in accordance with local codes and regulations.

8.13.2. Copper conductors for grounding shall be a minimum of 70 square millimeters.

8.13.3. Grounding cables shall be terminated in mechanical lugs bolted to the ground terminals of the equipment.

8.13.4. Series connections for grounding are prohibited.

8.14. Ground Fault Protection

8.14.1. All power systems derived on board the Crane shall be provided with ground fault detection and protection. The ground fault protection is applicable to the auxiliary and drive transformer low voltage distribution system on the crane. (8.14.3)

8.14.2. All ground fault protection and circuit interrupting equipment shall be certified for the specified uses at the Board's facility in accordance with applicable codes and regulations.

8.14.3. A separate ground fault protection shall be provided for auxiliary systems. System level ground fault trips must be properly sized and ensure that only individual non-critical systems will fault and the Crane operation will not be interrupted.

8.15. Over Speed Protection

8.15.1. Over Speed protection shall be provided for all main functions.

8.16. Load Monitoring System

8.16.1. A load monitoring system shall be provided to:

8.16.1.1. Indicate and record the lifted load

8.16.1.2. Prevent lifting loads in excess of the rated capacity

8.16.1.3. Prevent lifting loads with eccentricity beyond the design conditions

8.16.1.4. Work as a redundant system for slack rope indication (8.17).

8.16.1.5. Detect broken ropes

8.16.1.6. Comply with all local safety regulations.

8.16.2. The load monitoring system shall consist of approved load cells or load pins with integrated signal converters and isolated 4-20 mA output.

8.16.3. The load monitoring system shall monitor the load on the hoist ropes with an accuracy of ± 1.5% and precision of 0.1 LT.

8.16.4. The load monitoring system responsiveness must be fast enough to detect the load change in the wire rope in time to provide protection of all Crane components.

8.16.5. The total load shall be displayed digitally on the operator's display and all CMS screens and shall be easily readable at all times. A CMS screen shall be provided which displays the individual load cell readings as well as the total load.

8.16.6. The loads displayed on the operator's and CMS screens shall have the lifting system deducted so that the load displayed is the lifted load under spreader or under cargo beam. The CMS shall be able to differentiate between single lift spreader mode, twin lift spreader mode, and cargo beam mode automatically. Provisions shall be included for calibration and lift system tare adjustment (manual & automatic).

8.16.7. The load monitoring system shall have adjustable settings for:

8.16.7.1. Rated Load Warning – 98% of rated load

8.16.7.2. Overload Warning – 105% of rated load

8.16.7.3. Overload Stop – 110% of rated load

8.16.8. The load monitoring system shall be capable of compensating for dynamic loads.

8.16.9. Each alarm of 8.16.7 shall be programmable/adjustable by maintenance personnel.

8.16.10. The Crane shall be able to continue operation in the event of failure or malfunction of one or all components of the load monitoring system via key operated bypass.

8.16.11. Overload warnings shall be displayed on the operator's display and CMS screens.

8.16.12. Overload stops shall be displayed on the operator's display, CMS screens, and by an illuminated light on the operator's cabin floor display.

8.16.13. In event of an overload, hoisting and trolley travel shall be prohibited and lowering shall be permitted only at reduced speeds. The operating parameter shall be reset automatically once the load returns below the overload condition.

8.16.14. The accuracy of the overload protection system shall be ±1%.

8.16.15. The system shall be designed for the vibrations and shock loads of heavy equipment, suitable for exposed outdoor environment conditions.

8.16.16. The system shall be provided by a manufacturer with sales and support local to the Board's facility.

8.17. Slack Rope Protection

8.17.1. Slack rope detection devices shall be provided.

8.17.2. The slack rope detection system design is subject to approval by the Engineer.

8.18. Snag Protection

8.18.1. Snag protection shall be provided as part of the load monitoring system only.

8.19. Wind Speed Protection

8.19.1. The system shall be designed for the vibrations and shock loads of heavy equipment, suitable for exposed outdoor environment conditions and high wind conditions.

8.19.2. An engraved nameplate shall be provided in the operator's cabin which describes all wind alarm conditions.

8.19.3. The wind speed setting shall be adjustable with a minimum of three (3) wind alarm contact outputs or analog system which interfaces with the crane control system.

8.19.4. The system shall be provided by a manufacturer with sales and support local to the Board's facility.

8.20. Anti-Collision Systems

8.20.1. An anti-collision system shall be provided to prevent collision of the Crane with other Cranes, obstructions in the gantry runway, and end of travel limits.

8.20.2. The anti-collision system shall be by an Engineer approved laser system or similar.

8.21. Gantry Warning Systems

8.21.1. Audible alarms and flashing yellow lights shall be installed at each corner of the Crane.

8.21.2. The alarms and lights shall energize when the gantry drive is engaged.

8.21.3. The audible alarm shall have a sufficient noise level to be heard by personnel on the ground up to 30m from the Crane considering full operational wind speed and the operating terminal environment.

8.21.4. The alarms and lights shall be designed for the vibrations and shock loads of heavy equipment, suitable for exposed outdoor environment conditions.

8.21.5. The alarms and lights shall be provided by a manufacturer with sales and support local to the Board's facility.

8.22. Emergency Stops

8.22.1. Emergency stop buttons shall be provided where necessary to completely shut down the Crane and set all mechanical brakes to ensure safety of the Crane and all personnel.

8.22.2. As a minimum, emergency stop buttons shall be located:

8.22.2.1. Ground level one (1) on each sides of each leg

8.22.2.2. One (1) at the gantry cable reel location

8.22.2.3. One (1) at the diesel generator location

8.22.2.4. Two (2) on top of the trolley (one (1) on each side)

8.22.2.5. One (1) in the electrical control room

8.22.2.6. One (1) on the operator's console

8.22.2.7. One (1) on the headblock

8.22.2.8. One (1) at the spreader control panel mounted on the spreader

8.22.2.9. One (1) each at every maintenance and/or control station.

8.22.3. Large mushroom head type pushbuttons with manual reset shall be provided.

8.22.4. The pushbuttons shall be unobstructed from view, located at a convenient height, and clearly labeled "EMERGENCY STOP"

8.23. Limit Switches, Sensors, Protection Devices, Gate Switches

8.23.1. All switches, sensors, protection devices, gate switches, and other similar devices shall be rated and approved for outdoor marine environment from a reputable manufacturer with a proven track record for Crane installation.

8.23.2. All devices shall be mounted for convenience of maintenance and shall not be installed where subject to damage or will create a potential tripping hazard.

8.23.3. All devices shall be provided by a manufacturer with sales and support local to the Board's facility.

8.23.4. All devices shall be installed with 316 stainless steel hardware.

8.23.5. Limit switches, proximity sensors, and other Engineer approved position sensing devices shall be provided for:

8.23.5.1. Main Hoist

8.23.5.1.1. Hoist normal up limit

8.23.5.1.2. Hoist over-travel up limit

8.23.5.2. Trolley

8.23.5.2.1. End of travel normal slowdown

8.23.5.2.2. End of travel normal stop

8.23.5.2.3. End of travel over-travel stop

8.23.6. The PLC shall be used as a "smart" slowdown and stop for hoist and travel limits prior to activation of mechanical/electrical switches.

8.23.7. The trolley travel limit switches shall be located on the trolley with targets located on the main structure.

8.24. Enclosures

8.24.1. Enclosures reference all electrical boxes used for terminal boxes, junction boxes, pull boxes, control panels, outlet boxes, and other similar boxes for electrical wires and/or equipment and devices.

8.24.2. All enclosures shall be weatherproof and watertight enclosures of IP55 rating or higher made of 316 stainless steel in 2mm or greater thickness. In lieu of 316 stainless steel, SS304 may be used if properly painted for exterior use.

8.24.3. All enclosures shall be vertically mounted with hood latch doors with full, continuous hinges. Wind latches shall be provided on all doors which could be exposed to wind.

8.24.4. All hardware for mounting the enclosure and mounting of components within the enclosure shall be 316 stainless steel. Mounting shall not be made by bolting through the enclosure. Mounting shall be designed for the vibration and movement (inertia loads) of the Crane.

8.24.5. All enclosures which contain equipment and devices other than only wires shall be fitted with space heaters.

8.24.6. Convenience outlets shall be provided in all drive, control and I/O panels.

8.25. Wiring & Cables

8.25.1. All wiring used on the Crane shall be multi-strand copper conductors with nylon or PVC jackets as required for the installation.

8.25.2. All wires and cables shall be resistant to oil, chemicals, ozone, water, and UV exposure.

8.25.3. All cables types shall be approved for their location and purpose.

8.25.4. Splices are prohibited except in approved enclosures where no other alternative is possible. Crimp on butt connectors are prohibited.

8.25.5. Wires shall be segregated by voltage and purpose such as:

8.25.5.1. medium voltage (600V or greater),

8.25.5.2. main motor,

8.25.5.3. power,

8.25.5.4. control, and

8.25.5.5. low voltage

8.25.6. Communication wires shall be installed in dedicated conduit with 100% spare. When fiber optic cables are used for communication, separate conduits are not required, but 100% spares shall be provided.

8.25.7. All cable cores shall be terminated with appropriate lugs and fixtures. Fork type connectors are prohibited.

8.25.8. All wiring shall be run loose in conduit. Bundling the wires together with tape, tie straps, plastic wrap, etc. for wire pulling is prohibited.

8.25.9. Color-coding of power supply conductors shall be consistent.

8.26. Conduit & Cable Trays

8.26.1. Rigid heavy wall conduit shall be used for running all wiring. Painted galvanized steel cable trays will be acceptable in select exterior installations dependent on the Contractors design.

8.26.2. Conduit shall be seamless and galvanized.

8.26.3. As a minimum, 10% spare wires, but no less than one (1) shall be provided in each conduit for each size and type.

8.26.4. Conduit and conduit installation shall meet all applicable codes.

8.26.5. Conduit shall be neatly and professionally routed and installed in locations where it will be protected from damage of swinging loads or ground level equipment.

8.26.6. Conduit penetrations through structural plates shall be installed with rigid couplings and structural doubler plates.

8.26.7. Conduits shall be taper threaded in accordance with local codes.

8.26.8. In general, cable trays are prohibited; however, if approved by the Engineer on a selective basis, the following requirements shall apply:

8.26.8.1. Cable trays shall be 316 stainless steel with a 2mm minimum thickness.

8.26.8.2. Cable trays shall be installed parallel to walkways, ladders, platforms, etc. and be easily accessible.

8.26.8.3. Wiring run in cable trays shall have a UV resistant PVC jacket.

8.27. Marking & Labeling

8.27.1. All wires and cables shall be marked and labeled with numbering consistent with the circuit diagram.

8.27.2. Cable cores shall be identified with purpose made labels.

8.27.3. All wires shall be identified with heat shrink labels on each end. All wires visible within a pull box shall also be identified with labels, as approved by the Engineer

8.28. Circuit Identification

8.28.1. All circuits and wires shall be marked and labeled with numbering consistent with the circuit diagram.

8.29. Nameplates

8.29.1. All mechanical and electrical equipment whose purpose is not self-evident shall have a nameplate permanently attached which provides, as a minimum, the following:

8.29.1.1. Functional description

8.29.1.2. Ratings (voltages, current, torque, power, etc.)

8.29.1.3. Hazards & Precautions

8.29.2. All nameplates shall be engraved or stamped 316 stainless steel or brass written in English as required for each component.

8.29.3. All mechanical and electrical components/equipment shall bear a permanently fixed manufacturer's nameplate.

8.29.4. Damaged or painted over nameplates shall be replaced prior to Substantial Completion at the Contractor's expense.

8.30. Space Heaters

8.30.1. Space heaters shall be provided as required in these Specifications for motors 5kW or greater, brake enclosures, control panels, spreader motors and panels, and as required for all other enclosures as per 8.24.

8.30.2. Space heaters shall be thermostatically controlled.

8.30.3. Space heaters for motors and brakes shall be automatically switched off during operations.

8.30.4. Space heater function shall be monitored by the CMS and indication via LED light shall be provided.

8.31. Electrical Control Room

8.31.1. An electrical control room shall be provided on the truck lane side sill beam.

8.31.2. The electrical control room shall be an insulated, weather proof enclosure for housing the main controls, drives, electronic components, and primary CMS station.

8.31.3. The room shall be provided with a heavy duty, industrial, lockable, exterior door with 316 stainless steel hardware and panic bar. A drip shield shall be provided over the door. The door shall be painted 304 stainless steel.

8.31.4. The room shall be equipped with an HVAC system in accordance with 8.33.

8.31.5. The noise level in the electrical control room shall be less than 80 dBa during Crane operations. Noise level peaks above 80 dBa may be acceptable; however the noise level acceptance shall be based on 1 second RMS sampling time.

8.32. Illumination

8.32.1. The illumination system for the Crane shall be designed to provide sufficient illumination to all work areas of the Crane as follows:

Location Description	Maintained Average Illumination Level	Minimum Illumination Level
Between the Crane legs – 7.5m from centerline of Crane in gantry travel direction(at ground)	300 Lux	200 Lux
Outside of the Crane legs – 5m distance from leg (at 1m height)	100 Lux	50 Lux
Electrical Control Room (at floor level)	300 lux	200 lux
Operator's Cabin (Adjustable range 10%-100%)	300 lux	200 lux
Access system	50 lux	30 lux
Trolley (top)	100 lux	50 lux
Cable Reel & Diesel Generator locations	150 lux	100 lux

8.32.2. Illumination levels shall not exceed a 3:1 ratio within a 3m radius.

8.32.3. Illumination levels shall be calculated with an illumination loss factor of 0.85.

8.32.4. All Crane lighting systems shall be LED and control gear with a minimum operating life of 50,000 hours. Life time is based on a 30% reduction in initial light intensity.

8.32.5. All lights shall be minimum IP66 rated.

8.32.6. All lighting fixtures shall be designed to withstand the shock and vibration of these Crane applications.

8.32.7. Floodlights shall have lockable aiming adjustment of ±10° and be modular in design.

8.32.8. Control gear shall be 120V and offer over-voltage, over-temperature, over-current, and short circuit protection.

8.32.9. The control gear shall be protected from the environment and UV exposure by a secondary vented cover.

8.32.10. Mounting brackets shall be stainless steel and floodlight fixtures shall be secured with safety cables.

8.32.11. Replaceable optical lenses shall be mechanically fastened to the LED module.

8.32.12. LED circuit boards shall be sealed against moisture and be easily replaceable.

8.32.13. One (1) LED floodlight, minimum 40W, shall be provided at each gantry corner for illuminating the Crane runway in the direction of gantry travel.

8.32.14. Floodlights shall be provided on the trolley and operator's cabin to provide additional illumination of the spreader and containers.

8.32.15. All lights shall be accessible from walkways and access platforms.

8.32.16. Switches for access lighting shall be provided at the ground level, at the top of the girder, and in the operator's cabin.

8.32.17. Switches for flood lights shall be provided at the ground level and in the operator's cabin.

8.33. Heating & Air Conditioning

8.33.1. HVAC systems shall be provided for the operator's cabin and the electrical control room.

8.33.2. Electrical Control Room HVAC

8.33.2.1. The HVAC system shall have sufficient heating and cooling capacity to maintain a room temperature of 25°C and 50% relative humidity under all weather and operating conditions.

8.33.2.2. The HVAC system shall be a redundant system to ensure that the room temperature does not exceed 30°C and 50% relative humidity under any condition if one unit fails.

8.33.3. The HVAC systems shall be provided by a manufacturer with sales and support local to the Board's facility.

8.34. Power & Convenience Outlets

8.34.1. Power and convenience outlets shall be provided throughout the Crane to facilitate maintenance.

8.34.2. Convenience outlets shall be of the voltage/rating standard at the Board's facility and designed for an external marine environment and installed in accordance with local codes.

8.34.3. As a minimum, not less than fifteen (15) duplex convenience outlets shall be provided in the following locations:

8.34.3.1. Four (4) at ground level; one (1) on each side of each leg

8.34.3.2. One (1) at gantry cable reel location

8.34.3.3. One (1) at diesel generator location

8.34.3.4. Three (3) in the electrical control room

8.34.3.5. Three (3) in the operator's cabin

8.34.3.6. One (1) on top of the trolley

8.34.3.7. One (1) on each main girder

8.34.4. All outlets shall be grounded, IP54 rated and weather tight with min 600V wire insulation.

8.35. Switches

8.35.1. Pushbuttons and selector switches shall be provide as required by these Specifications.

8.35.2. Pushbuttons and selector switches shall be IP55 rated.

8.35.3. All pushbuttons and selector switches shall be labeled with an engraved 316 stainless steel permanently installed nameplate.

8.36. Alarms, Horns, & Communication

8.36.1. A four way communication system shall be provide with stations installed:

8.36.1.1. Ground level on both sides of the Crane

8.36.1.2. In the electrical control room

8.36.1.3. In the Operator's cabin

8.36.2. The communication station in the Operator's cabin shall be hands free.

8.36.3. The communication system shall allow for voice communication to all stations from any station as well as loud-speaker functionality from any station.

8.36.4. Board supplied radio equipment requiring 12VDC power supply and provision for mounting shall be installed in the operator's cabin.

8.36.5. All components shall be designed for the vibrations and shock loads of heavy equipment, suitable for exposed outdoor environment conditions.

8.36.6. The components shall be provided by a manufacturer with sales and support local to the Board's facility.

8.37. Main Control System

8.37.1. The Crane's main control equipment shall be a fully digital, programmable, microprocessor based system.

8.37.2. The main control system shall use a programmable logic controller (PLC) in accordance with 8.39 for all interlocking functions.

8.37.3. All emergency protection functions and emergency stops (8.22) shall be hard wired and monitored for indicating purposes by the PLC.

8.37.4. The main control system shall provide user-friendly status monitoring and fault diagnostics with graphical displays in the Crane Management System (CMS) in accordance with 8.40.

8.37.5. Frequency inverters for the control of the main drives, braking units, control relays, protection and distribution equipment shall be installed in the electric control room .

8.37.6. Inverters shall be designed for control of the hoist, trolley, and gantry motions.

8.37.7. Simultaneous operations shall be possible for:

8.37.7.1. Main Hoist & Trolley

8.37.7.2. Trolley & Gantry

8.38. Main Drive System

8.38.1. The drive system supplier shall be a reputable supplier with over forty (40) delivered units of the proposed electrical control system. The supplier shall have qualified personnel to provide after-sales support for the system through their own personnel available in the vicinity of the Board's facility.

8.38.2. Main Control

8.38.2.1. The main hoist drive AC motor shall be controlled by a frequency inverter. The controller shall permit running at higher motor speeds with loads less than the rated load.

8.38.2.2. The drive shall be vector controlled with speed feedback by digital pulse encoders.

8.38.2.3. Deceleration shall be achieved by regenerative braking which shall be slow and stop the motor prior to setting of the main hoist brakes.

8.39. Programmable Logic Controller (PLC)

8.39.1. A programmable logic controller (PLC) shall be used to perform the logic functions on the Crane, display warnings and alarms on the CMS, and to assist in troubleshooting.

8.39.2. All major drive controls (hoist, trolley, gantry) shall be full digital, stepless control performed by the PLC.

8.40. Crane Management System (CMS)

8.40.1. A crane management system (CMS) shall be installed on the Crane and work in conjunction with the PLC.

8.40.2. The CMS shall provide continuous monitoring, diagnostics and data collection.

8.40.3. Maintenance counters which display warning and alarms indicating required inspections, replacements, etc. shall be provided.

8.40.4. CMS displays shall be provided in the operator's cabin and in a CMS room located in the electrical control room, with full CMS functionality at each location.

8.40.5. The CMS shall be in the local language and English, where English is not the local language.

8.40.6. The CMS screens shall be customized to the Board's reasonable request for improved comprehension by the operators and maintenance personnel. This includes changes of terminology, units, etc. to improve understanding based on local conventions/language.

8.40.7. The CMS shall have password protected levels of access for maintenance functions. The Board shall have control over all passwords and level of access for each password. No level of CMS access or functionality shall be unavailable to the Board's maintenance personnel whether it is for troubleshooting, programming or any other reason deemed necessary by the Board. Under no circumstances shall the Board's access be limited such that contact/coordination with the Contractor is required to gain access.

8.41. Remote Crane Management System (RCMS)

8.41.1. An RCMS shall be provided to permit advanced control system faults, diagnostics, and drive evaluation on the Crane. Modifications and bypass activation are not required from the RCMS.

8.41.2. The RCMS shall be capable of remote monitoring and diagnostics of all CMS functions at the crane maintenance office through the fiber optic link in the MV cable.

8.41.3. All equipment required on the Crane and at the remote site, including a desk mounted computer, monitor, color printer, communication devices, etc. shall be provided and installed by the Contractor. The yard infrastructure and devices required between the Crane and the RCMS site will be installed and commissioned by the Board.

8.41.4. All functions available on the local CMS shall be available on the RCMS.

8.42. Laptops

8.42.1. One (1) laptop per Crane shall be provided with full CMS capability for plugging into the Crane at the ground level for maintenance purposes.

8.43. Licenses, Security, & Remote Access

8.43.1. All license keys, activation codes, hardware key devices, etc. required for functioning of all hardware and software shall be provided to the Board prior to start of commissioning. During the warranty period, software modifications and parameter changes will be approved by the Contractor.

8.43.2. Documentation shall be provided detailing how to recover these items, if misplaced.

8.43.3. Additional licenses for programming software shall be provided for PLC, HMIs, drives, etc. A total of three (3) licenses shall be provided in addition to the ones required on the crane and on the provided laptops.

8.44. CCTV

8.44.1. A closed circuit television (CCTV) system shall be provided for improved gantry travel visibility.

8.44.2. A digital CCTV camera shall be installed at each of the four (4) corners of the Crane, directed along the runway to provide visibility of any potential runway obstructions. Each camera shall be fitted with a rain cover.

8.44.3. A split screen color monitor shall be provided in the operator's cabin and automatically display the view of the two cameras pointed in the direction of gantry travel while the gantry drives are energized.

8.44.4. The cameras and monitors shall be designed for the vibrations and shock loads of heavy equipment, suitable for exposed outdoor environment conditions.

8.44.5. The system shall be provided by a manufacturer with sales and support local to the Board's facility.

8.45. Automatic Steering

8.45.1. An automatic steering system shall be provided to eliminate the need for the operator to steer the Crane.

8.45.2. The automatic steering system shall ensure a maximum ±50mm lateral deviation and ±1.0° angular deviation from the runway axis.

8.45.3. Automatic shutdown shall occur when the deviation exceeds a maintenance controlled value.

8.45.4. The system shall allow the operator to gain control over the automatic function on demand.

8.45.5. The system shall require no civil works for functionality.

8.45.6. The system shall be provided by a manufacturer with sales and support local to the Board's facility.

9. Cabins

9.1. Operator's Cabin

9.1.1. The Crane shall be provided with an operator's cabin which shall be suspended from the trolley, such positioned to provide maximum visibility at all times.

9.1.2. The cabin shall be an enclosed rigid steel structure designed to prevent distortion and cracks.

9.1.3. The cabin interior shall be adequately sized to accommodate an operator's chair, control panels, operator's screens, and a fold-up seat for driver training while providing maximum accessibility and sufficient space for easy maintenance access.

9.1.4. The cabin floor shall have no raised obstructions other than seating and control consoles.

9.1.5. The cabin shall be mounted with anti-vibration rubber mountings designed to isolate the cabin from operational vibrations and noise.

9.1.6. Access to the cab shall be from a key lock side access door and access platform.

9.1.7. All cabin hardware and component hardware shall be 316 stainless steel.

9.1.8. The cabin shall include a fully upholstered adjustable and rotating operator's chair.

9.1.9. The operator's chair shall be adjustable fore/aft and vertically.

9.1.10. The operator's chair shall be designed for the horizontal and vertical inertia forces of the Crane.

9.1.11. The side windows of the cabin shall be anti-glare, tinted safety glass and upper windows shall be provided with roller sun shades.

9.1.12. Sun shades shall cover the upper and lower window and shall have receiver latches to lock the shade in the fully extended position.

9.1.13. The floor window(s) shall be load bearing, multi-layer safety glass capable of supporting the maximum load of operators or maintenance personnel standing on the glass. The safety glass shall be provided with certifications for the required load bearing ratings.

9.1.14. Floor window(s) shall be folding type to permit cleaning from within the cabin.

9.1.15. Protective grating, whether internal or external to the cabin, shall not be required.

9.1.16. Window washers and wipers shall be provided for all lower lateral windows.

9.1.17. Window wiper motors shall be multi-speed and designed to operate in the Erection Site conditions.

9.1.18. The cabin shall be equipped with an HVAC system in accordance with 8.33.

9.1.19. An electric defogging/demisting system shall be provided for the main floor glass.

9.1.20. The operator's chair main consoles shall include the main function master controllers and controls for frequent use functions.

9.1.21. Less frequent, periodic used controls, indicating lights and non-essential functions shall be located on a separate panel conveniently accessible by the operator from the operator's chair.

9.1.22. An operator's CMS screen shall be positioned within easy reach of the operator.

9.1.23. Provisions shall be made for the installation of the Board provided radio equipment.

9.1.24. An approved fire extinguisher shall be provided in the cabin.

9.1.25. The noise level in the cabin shall not exceed 80dBa in any operating condition.

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10. Access Systems

10.1. General

10.1.1. The access systems on the Crane shall be in full compliance with OSHA, F.E.M., local requirements, and any Board requirements.

10.1.2. Access systems shall be provided on the Crane to ensure all equipment, components, or areas requiring operation, maintenance, lubrication, or inspection (including structural inspections) can be safely and easily serviced from a platform or walkway without the need for manlifts or other outside mobile equipment.

10.1.3. Access shall be provided on for the full length of both girders.

10.1.4. All access system components shall be attached to the Crane structure by bolting only.

10.1.5. Welding of any access system components to the Crane structure is prohibited.

10.1.6. The width of access systems shall be maximized based on the Crane structure, but in no case shall the width be less than 760mm, unless approved by the Engineer.

10.1.7. Access systems near the ground level shall be designed to maximize protection from damage due to traffic.

10.2. Stairs

10.2.1. Unless approved by the Engineer or specified otherwise in these Specifications, vertical access throughout the Crane shall be by stairs only.

10.2.2. Stair systems shall comply with OSHA, however, the angle of the stair system shall not exceed 45°.

10.2.3. Stair treads shall be galvanized heavy duty bar grating bolted to the stringers.

10.2.4. All stairway system components, except treads, shall be painted in accordance with Section 11.

10.3. Ladders

10.3.1. Vertical ladders shall be avoided as much as possible. The use of ladders will be reviewed by the Engineer on a case by case basis for approval consideration.

10.3.2. A ladder is acceptable for access to the top of the trolley from the operator's cabin.

10.3.3. Ladder rungs shall be ¾" round bar. The use of rebar or square bars for ladder rungs are prohibited.

10.3.4. Ladder cages shall be provided as required by the governing codes.

10.3.5. Vertical length of any ladder run shall not exceed 3m.

10.3.6. Ladder rungs must be equally spaced at 300mm. Slight variation from 300mm may be approved by the Engineer for proper alignment with lower and upper platforms.

10.3.7. Ladder rungs shall be spaced with a minimum 175mm toe clearance from the nearest obstruction.

10.4. Platforms

10.4.1. Grating for platforms shall be galvanized heavy duty bar grating bolted to the support structure.

10.4.2. A platform shall be provided around all sides of the main power cable reel slip ring box.

10.4.3. A platform shall be provided for sufficient maintenance access and serviceability of the diesel-generator.

10.4.4. A platform shall be provided to allow cleaning of the operator's cabin glass. The platform may be omitted if the Contractor can demonstrate acceptable methods for cleaning of the glass and maintenance of wipers without a platform.

10.5. Walkways

10.5.1. Grating for walkways shall be hot-dip galvanized heavy duty bar grating bolted to the support structure.

10.5.2. Clamping type fasteners are prohibited.

10.5.3. Where walkways are incorporated with the Crane structure, the walk surfaces shall be painted in accordance with Section 11 with the addition of non-slip/skid additive in the final coat.

10.6. Handrails

10.6.1. Handrails shall be provided on both sides of all stairs, platforms, and walkways.

10.6.2. Handrails shall be constructed from Sch. 40 pipe, with 42mm diameter for the top rail.

10.6.3. Handrail stanchions shall be constructed from angle iron. Where angle iron is not practical, standard plate, bar, or rolled steel may be considered.

10.6.4. Openings in handrails shall be provided with automatically closed gates. Chains are prohibited.

10.7. Toe Plates

10.7.1. Toe plates with a minimum height of 100mm (4") shall be provided on both sides and ends of all walkways and platforms.

10.7.2. Toe plates shall be attached by bolting.

11. Corrosion Protection

11.1. General

11.1.1. All steel and metallic surfaces of the Crane shall be painted except for 316 stainless steel components (unless required otherwise in these Specifications), nameplates, and machined components where seals, bearings or other rotating mechanisms will be running.

11.1.2. The coating system shall be warranted for a full five (5) years from Substantial Completion of the Crane.

11.1.2.1. Coating system warranty applies to all coating systems with no exceptions.

11.1.2.2. Corrosion or damage caused by physical or mechanical damage, fire, explosions, welding, or similar actions are excluded from the warranty.

11.1.2.3. Warranty claims shall be based on corrosion of substrata in excess of ASTM-D610/SSPC-Vis2 Grade 5 on 1% of the total area or 3% of an area of $10m^2$.

11.1.3. The Contractor's standard coating system shall be considered subject to the Engineer's approval and Contractor warranty guarantees.

11.2. Surface Preparation

11.2.1. All dirt, oil, grease, chemicals, or other surface contaminants shall be removed by solvent cleaning and washing per SSPC-PA1 prior to the start of surface preparation.

11.2.2. After cleaning and washing, surfaces shall be blasted to SSPC SP10 (NACE 2) to a surface profile (anchor pattern) of 50-75 microns.

11.2.3. Power tool cleaning to SSPC-SP3 will only be approved on a case by case basis. Hand tool cleaning is prohibited.

11.2.4. All sharp edges shall be broken to a radius of 2mm.

11.2.5. Special attention shall be given to welds and surfaces in difficult to reach areas.

11.2.6. After blasting, the surface shall be made dust free prior to application of any coating. Acid washing, rust inhibitors, or other cleaning solvents/solutions are prohibited.

11.2.7. Blasted surfaces shall be coated with an initial coat of primer within four (4) hours of blasting.

11.2.8. Should visible rust develop or the steel become wet prior to primer application, the surface shall be re-blasted.

11.2.9. Blasting and coating application not performed within an atmospherically controlled area shall only occur during daylight on dry surfaces when all required environmental conditions are satisfied.

11.2.10. Steel surface temperature shall be greater than 3° C above the dew point and relative humidity shall be less than 85% for surface preparation activities to be performed.

11.2.11. All steel surfaces shall receive 20 microns of shop primer after surface preparation.

11.3. Coating Application

11.3.1. All materials for coating application shall be new, unopened, and purchased specifically and solely for use on these Cranes.

11.3.2. Mixing of different coatings is prohibited.

11.3.3. Coating application shall be performed in strict compliance with paint supplier's instructions.

11.3.4. Thinning of coating shall be performed in strict compliance with paint supplier's instructions.

11.3.5. Environmental conditions must be within the requirements of the paint supplier for coating application to be performed. In the absence of requirements from the paint supplier:

11.3.5.1. Relative humidity shall be less than 80%

11.3.5.2. Temperature shall be greater than 5° C

11.3.5.3. Steel surface temperature shall be at least 5° C above the dew point.

11.3.5.4. Wind velocity shall be less than 7 m/s.

11.3.5.5. Steel surface shall be dry.

11.3.6. Application of additional coats shall be performed within the recoat interval of the paint supplier.

11.3.7. Coating shall not be applied within 200mm of surfaces which have not been blasted.

11.3.8. Coating shall be applied uniformly over the complete surface without skims, skips, sags, drips, runs, pinholes, mud cracks, or other application defects. All defects shall be repaired.

11.3.9. Coating application shall be performed to minimize damage to completed coatings.

11.3.10. Dry film thickness of each coat shall meet the requirements of these Specifications.

11.3.11. Each coat shall be of contrasting color; finish coat colors shall be in accordance with 12.2.

11.3.12. All coating application equipment and materials shall be cleaned, monitored, protected, mixed, etc. according to the paint supplier's requirements.

11.3.13. Recommended pot life shall not be exceeded. When exceeded, the spray pot, hoses, pumps, etc. shall be emptied and cleaned and new material shall be used.

11.3.14. Use of materials beyond the suppliers recommended shelf life is prohibited.

11.4. Application Methods

11.4.1. All coatings shall be applied by conventional or airless spray unless the Contractor can demonstrate that spray application is not possible or for minimal areas of coating repair.

11.4.2. Brush application may be permitted on interior surfaces of air tight members provided that maximum film thickness is not exceeded and sags, runs, mud cracks, and other application defects are avoided.

11.4.3. Stripe coating of welds, edges, and difficult to reach areas is permitted by brush application.

11.4.4. Stripe coating or special attention during spray application shall be performed for all crevices, corners, and other areas where wet coating can collect to ensure voids, mud cracks, and bubbles are avoided.

11.5. Exterior Surfaces

11.5.1. Exterior surfaces which include all areas directly exposed to the environment shall be coated as follows:

Coat	Coating Description	Dry Film Thickness (min)
Primer	Epoxy rich primer	75 microns
Mid-Coat	Epoxy polyamide	200 microns
Top Coat	Aliphatic polyurethane	75 microns
Total System		350 microns

11.6. Interior Surfaces – Non-Airtight Surfaces

11.6.1. Interior, non-airtight surfaces which include all areas with indirect exposure to the environment shall be coated as follows:

Coat	Coating Description	Dry Film Thickness (min)
Primer	Epoxy rich primer	50 microns
Mid-Coat	Epoxy polyamide	150 microns
Total System		200 microns

11.6.2.

11.7. Interior Surfaces – Airtight Surfaces

11.7.1. Interior, airtight surfaces which include all areas with absolutely no exposure to the environment shall be coated as follows:

Coat	Coating Description	Dry Film Thickness (min)
Primer	Epoxy rich primer	50 microns
Total System		50 microns

11.7.2. Pipes less than 800mm diameter require no interior coating, but shall be protected from corrosion from receipt of material through sealing. Pipes with corrosion of the interior surfaces prior to sealing shall be replaced.

11.7.3. Pipes greater than 800mm shall receive shop primer only on the interior surfaces.

11.8. Interior Surfaces – Cabins & Houses

11.8.1. Interior surfaces of all cabins, houses, and electrical control rooms shall be coated as follows:

Coat	Coating Description	Dry Film Thickness (min)
Primer	Epoxy rich primer	75 microns
Mid-Coat	Epoxy polyamide	100 microns
Top Coat	Aliphatic polyurethane	75 microns
Total System		250 microns

11.9. Galvanized Surfaces

11.9.1. All hot-dipped galvanized surfaces shall be coated after galvanizing as follows:

Coat	Coating Description	Dry Film Thickness (min)
Primer	Epoxy rich primer	50 microns
Top Coat	Aliphatic polyurethane	50 microns
Total System		100 microns

11.9.2. Unpainted galvanized surfaces shall be accepted provided that damage of galvanized components will be replaced in lieu of repair methods utilizing corrosion protection methods other than hot dip galvanization.

11.10. Faying Surfaces

11.10.1. All faying surfaces of slip critical connections shall be coated as follows:

Coat	Coating Description	Dry Film Thickness
Primer	Zinc Rich Silicate Primer *Must be pre-qualified to provide the necessary slip coefficient required by the connection design. Qualification shall be provided.	30 - 50 microns
Total System		30 - 50 microns

11.10.2. All other faying surfaces that are not slip critical connections shall be painted in accordance with 11.6.

11.11. Anti-Skid

11.11.1. Anti-skid product shall be provided by the paint supplier and applied evenly on the surface immediately upon application of the mid-coat while the paint is still wet.

11.11.2. After the paint dries, sweep out excess material and apply the top coat.

11.11.3. Sand or blasting mediums (shot or grit) are prohibited as anti-skid material.

11.12. Repair/Touch-up

11.12.1. Care shall be taken to minimize damage to initial coating system application.

11.12.2. When the coating system is damaged to the base metal, spot cleaning shall be performed.

11.12.3. The damaged area shall be power tool cleaned according to SSPC-SP3 after the area has been cleaned.

11.12.4. The surrounding coating shall be feathered to remove all cracked, loose, or damaged coating.

11.12.5. Feathering shall be performed by power or hand sanding with a grit wheel.

11.12.6. Feathered areas shall be free of loose, burnt, or blistered coating.

11.12.7. Repair coating shall be performed in accordance with the original system for the damaged area.

11.13. Paint Supplier Site Representative

11.13.1. The paint supplier shall have a full time representative assigned to this project and must be on site daily to witness/review all coating activities identified in this section.

11.13.2. Coating activities are prohibited if the paint supplier's representative does not make daily inspections on site.

12. Paint Scheme & Signage

12.1. General

12.1.1. The Crane shall be coated in accordance with the requirements of Section 11.

12.2. Paint Color Scheme

12.2.1. The top coat colors of the Crane shall be as follows:

Description	RAL #	Special Instructions
Main Structure		Carboline Blue 2127 / IPK PHN79N/046
Trolley Structure		Carboline Blue 2127 / IPK PHN79N/046
Gantry Structure		Carboline White 1864 / IPK PHN79M/046
Electrical House (Exterior)		Carboline White 1864 / IPK PHN79M/046
Electrical House (Interior)		Carboline Gray 4753 / IPK PHN79P/046
Diesel Generator Enclosure		Carboline White 1864 / IPK PHN79M/046
Operator's Cabin (Exterior)		Carboline White 1864 / IPK PHN79M/046
Operator's Cabin (Interior)		Carboline Gray 4753 / IPK PHN79P/046
Handrails		Carboline Blue 2127 / IPK PHN79N/046
Platforms, Ladders, Walkways		Carboline Blue 2127 / IPK PHN79N/046
Stair Treads & Grating		Galvanized
Wheels		Carboline White 1864 / IPK PHN79M/046
Sheaves		Carboline Yellow 6666 / IPK PH9S15
Safety Devices		Carboline Yellow 6666 / IPK PH9S15
Headblock	2004	
Spreader	2004	

12.2.2. Trip hazards and other obstructions shall be painted with diagonal yellow and black stripes.

12.3. Logos

12.3.1. Board's Logo

12.3.1.1. The Board's logo shall be applied on the outside web of each girder on the left side of the girder.

12.3.1.2. Across the center of the girder, shall be written "Port of New Orleans" or other phrase as directed by the Board or Engineer.

12.3.2. Contractor's Logo

12.3.2.1. The Contractor may, at their option, include their logo or company name on the outside web of each girder on the right side of the girder. The logo/name is not to be larger than the Board's logo.

12.3.2.2. The size and placement of the Contractor's logo/name is subject to the Board's approval.

12.4. Nameplates

12.4.1. General

12.4.1.1. Nameplates shall be provided for all controls, drives, stainless steel boxes, motors, equipment, components, lubrication points, switches, buttons, etc.

12.4.1.2. All nameplates shall be either engraved or embossed 316 stainless steel or brass plates permanently mounted on the Crane.

12.4.2. Manufacturer's Nameplate

12.4.2.1. Three (3) manufacturer's nameplates shall be provided on the Crane in the following locations:

12.4.2.1.1. One (1) – Gantry level near main access system

12.4.2.1.2. One (1) – Inside the electrical house

12.4.2.1.3. One (1) – Inside the Operator's cabin

12.4.2.2. The nameplates shall be engraved on a 316 stainless steel plate and permanently mounted to the Crane in the locations specified.

12.4.2.3. The nameplate shall, as a minimum, include the following information:

12.4.2.3.1. Manufacturer's name & address

12.4.2.3.2. Crane main specifications

12.4.2.3.2.1. Capacity

12.4.2.3.2.2. Speeds

12.4.2.3.2.3. Main motor sizes

12.4.2.3.2.4. Principle dimensions

12.4.2.3.3. Crane serial number

12.4.2.3.4. Manufacture date

12.4.2.3.5. Manufacturer's trademark

12.5. Crane Numbers

12.5.1. Crane numbers shall be installed on both sides of the Crane at the top of each leg.

12.5.2. Crane numbers shall also be installed on each end of the sill beams.

12.6. Warnings

12.6.1. Safety signs, labels, and other warning signage shall be clearly marked and placed in unobstructed view.

12.6.2. Emergency stops located at the gantry level shall have "EMERGENCY STOP" written in 100mm (4") white letters against a red background.

13. Safety

13.1. General

13.1.1. The Crane shall be designed to ensure maximum safety of the operators, maintenance personnel, ground personnel, terminal tractor drivers, and any other personnel in the vicinity of the Crane during operation.

13.1.2. Signage shall be installed in accordance with Section 12.

13.2. Guards

13.2.1. Guards shall be provided around all rotating machinery and when necessary to protect personnel.

13.2.2. Guards shall be easily removable to facilitate maintenance.

13.2.3. Guards shall be of rigid design to minimize vibration or movement.

13.2.4. Safety guards shall be provided on both sides of each gantry bogie.

13.3. Fire Extinguishers

13.3.1. A minimum of five (5) fire extinguishers shall be provided on the Crane, in the following locations:

13.3.1.1. One (1) – Outside the operator's cabin

13.3.1.2. One (1) – Inside the electrical house

13.3.1.3. One (1) – On top of the trolley

13.3.1.4. Two (2) – At the gantry level, one (1) on each side of the Crane

13.3.2. If, in the Contractor's opinion to maximize safety or in order to meet required codes, additional fire extinguishers shall be installed on the Crane.

13.3.3. Fire extinguisher type shall be suitable for the location installed.

13.3.4. If a fire extinguisher must be installed that is not suitable for use on electrical components, is shall be clearly marked with "Do not use on live electrical equipment".

13.3.5. Any fire extinguisher which could cause harm to personnel shall be clearly labeled identifying the danger.

13.4. Emergency Access

13.4.1. Emergency access shall be provided such that a disabled operator can be removed from the Crane at any part of the range of trolley travel.

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14. Maintenance Tools & Equipment

14.1. General

14.1.1. The Crane shall be designed to minimize and simplify maintenance.

14.1.2. Systems shall be installed on the Crane to simplify required maintenance on the Crane.

14.1. Welding Outlets

14.1.1. Welding outlets shall be provided on both sides of the Crane at the gantry level and on top of the trolley.

14.1.2. The voltage and type of receptacle to be installed shall be Crouse Hinds NR642 – 60A/3wire/4pole and shall be in accordance with all codes and regulations.

14.2. Air Compressor

14.2.1. An AC electric motor drive air compressor shall be installed on the Crane.

14.2.2. The air compressor shall be complete with automatic-manual reloader, intake filter, water trap, instruments, controls, and 50L receiver, all rated for 10 bar (145 psi) or greater as required for inflating gantry tires.

14.2.3. The compressed air shall be routed to convenience outlets installed in the following locations:

14.2.3.1. Gantry level on both sides of the Crane

14.2.3.2. Electrical house

14.2.3.3. Diesel-generator enclosure

14.2.3.4. Top of both girders

14.2.4. The convenience outlets shall be terminated with an oil-water separator connected to a stainless steel quick-disconnect coupling (US size).

14.2.5. Piping to the convenience outlets shall be by painted steel pipes.

14.2.6. Flexible hose is prohibited except at area of relative movement.

14.3. Communication System

14.3.1. A low voltage communication system shall be installed on the Crane with stations located at:

14.3.1.1. Both sides of the Crane at the ground level

14.3.1.2. In the operator's cabin

14.3.1.3. In the electrical house

14.3.1.4. At the diesel-generator enclosure

14.3.1.5. On top of the trolley

14.3.2. The stations in the operator's cabin and the electrical house shall be provided with a hands free option.

14.3.3. The system shall allow voice communication to all stations from any other station.

14.3.4. Each station shall have a call button and a loud speaker to allow each station to address all personnel on the Crane.

14.3.5. All exterior installed units shall be mounted in a weather proof enclosure.

14.3.6. Each station shall have volume controls.

14.3.7. A flexible corded headset shall be provided with the hands free unit in the electrical house and shall allow for use anywhere in the electrical house.

14.4. Maintenance Hoist

14.4.1. An electric maintenance hoist shall be provided on top of the trolley.

14.4.2. The maintenance hoist shall be mounted on s swivel jib and shall be capable of reaching all components installed on the trolley.

14.4.3. The maintenance hoist shall be capable of lifting the heaviest component on the trolley and safely lowering it to the ground.

14.4.4. The maintenance hoist shall be provided with 316 stainless steel pin locking system to prevent rotation of the jib during Crane operation.

14.5. Re-reeving Systems

14.5.1. The Crane wire rope system shall be designed for convenient, efficient replacement of ropes.

14.5.2. If the Contractor cannot demonstrate an acceptable method of changing the ropes to the Engineer, the Contractor shall provide a re-reeving system to simplify wire rope changes.

14.5.3. The re-reeving method and design of a re-reeving system are subject to approval by the Engineer.

14.6. Oil Drain

14.6.1. Provisions shall be provided for convenient access to reducer drain valves such that a flexible drain hose can be routed to an empty oil drum at the ground level.

14.6.2. All oil filled gearboxes shall have a gate valve with tapered plug installed to facilitate draining.

14.7. Tools

14.7.1. The Contractor shall provide a complete set of tools for the maintenance of the Crane. The list shall, as a minimum, include the following in addition to special tools required for maintenance of the Crane.

Item	Qty.	Description	Preferred Mfg.	Mfg. Model #
001	1	Craftsman 202pc. socket set	Craftsman Industrial	9-29791
002	1	Wrench metric set 18pc.	Proto	J1200R-MASD
003	1	Wrench SAE set 14pc	Proto	J1200FBASD
004	1	Screw driver set 8pc.	Klein Tools	85078
005	1	Allen wrench set 22pc.	Eklind	13222
006	1	Nut driver set metric 7pc.	Klein Tools	65160
007	1	Nut driver set SAE 7pc.	Klein Tools	631
008	4	Klein Tools zipper Bag	Klein Tools	5139
009	1	Crescent wrench set 3pc.	Proto	J795
010	1	Vise grip set 10pc.	Visegrip	1078TRT
011	1	Electrician plier set 6pc	Proto	J201GS

012	1	Long needle nose 2pc.	Blackhawk by Proto	PT-1002XS
013	1	Channel lock set 3pc.	Channellock	VJ-3
014	1	Adjustable wrench set 8pc.	Channellock	GS-28
015	1	1.5 lb dead blow hammer	NUPLA	10010
016	1	3 lb dead blow hammer	NUPLA	10035
017	1	12 oz soft face hammer	Vaughan	SF12
018	1	2 lb engineers hammer	NUPLA	6894054
019	1	4 lb engineers hammer	NUPLA	6894051
020	1	8 oz ball pein hammer	Vaughan	TC308
021	1	16 oz ball pein hammer	Vaughan	TCO16
022	1	24 oz ball pein hammer	NUPLA	21024
023	1	32 oz ball pein hammer	NUPLA	21032
024	1	40 oz ball pein hammer	NUPLA	21040
025	1	6 lb sledge hammer	Council Tool	PR600
026	1	8 lb sledge hammer	Jackson	1197900
027	1	punch & chisel set	Westward	2AJL8
028	1	pry bar set 4 pc.	Proto	J2100
029	1	60" pinch point bar	Westward	3FE91
030	1	42" aligning bar	Mayhew	40023
031	1	36" connecting bar	Klein Tools	3246
032	1	24" connecting bar	Klein Tools	3247
033	1	25" & 31" curve tip ergo pry bar 2 pc.	Dominator	61353
034	1	17" curve tip ergo pry bar	Dominator	60143
035	1	Dewalt 1/2" cordless hammer drill	Dewalt	DCD950KX/DC9096
036	1	Fluke Multimeter	Fluke	Fluke-87-V
037	1	screw bit set	Irwin	3057018
038	1	3/4" drive metric impact socket 21 pc. set 19mm - 41mm	Proto	J72103M
039	1	scraper set 4 pc.	Mayhew	37365
040	1	Pipe wrench set 2 pc .10"-14"	Westward	4YR92
041	2	6" C-clamp	Westward	2HUL1
042	2	6" deep C-clamp	Westward	2HUK2
043	1	drill bit set 15 pc	Chicagolatrobe	69889
044	1	Nutsetter kit SAE 6 pc.	Blackhawk by Proto	BI-NS6
045	1	Nutsetter kit 8 pc.	Wera	5071230004
046	1	4 1/2" electric grinder	Makita	GA4530
047	1	8" bench grinder package	Dayton	7YT69
048	1	6 1/2" vise	Wilton	676
049	2	fluorescent drop light	Lumapro	6X971
050	1	3/8" pneumatic drill	Westward	5ZL27

051	1	pneumatic die grinder	Westward	5ZL22
052	1	pick and hook set	Westward	1EKB1
053	2	3/4 ton come along 10' chain	Oz Lifting Products	OZ075-10LHOP
054	1	Welding shield	Sellstrom	29301-10WW
055	1	welding shield lens	Sellstrom	16510
056	1	welding gloves	Caiman	1420
057	1	wire brush	Tough Guy	1VAG7
058	1	chipping hammer	Vaughan	SC16
059	1	combination square set	Westward	4KU80
060	1	framing square	Johnson	CS5
061	1	25' tape measure	Stanley	33-279
062	1	60" straight edge	Johnson	J60
063	1	48" level	Stanley	42-076
064	1	Torpedo level	Klein Tools	930-9
065	1	24" Level	Westward	4MRW1
066	1	magnetic dial indicator	Mitutoyo	64PKA079
067	1	feeler gauges	Proto	J000SL
068	1	dial caliper 12”	Starrett	12OZ-12
069	1	monkey wrench	Ampco	W-1148
070	1	adjustable spanner wrench	Westward	32J064
071	1	hook spanner wrench 2"-4 3/4"	Ampco	WP-6-ST
072	1	telescoping inspection mirror	Proto	J2372
073	1	telescoping magnet	Proto	J2375
074	1	infrared thermometer	Westward	2ZB46
075	1	caulking gun	3M	08993
076	1	insulated screwdriver set 13 pc.	Wera	05345211001
077	10	tool drawer liner		2H182
078	1	tool chest	Craftsman	32916 / 33306
079	2	safety harness	Titan	TFPK-4/U/6FTAK
080	1	4' step ladder	Louisville	FS2004
081	1	6' step ladder	Louisville	FS2006
082	1	500 lb step stool	Cramer	1001-43
083	1	bolt extractor set	Mayhew	37331
084	1	55 gal. trash can	Tough Guy	5DMU6
085	5	41 1/4qt trash can	Tough Guy	4PGP1
086	2	welders magnet	SAV	243.03
087	1	welding machine	Miller	907251
088	1	Clamp on amp meter	Fluke	FLUKE-373
089	2	Extension cord 50’	Power First	1FD55
090	2	Extension cord 25’	Power First	1FD65

091	1	Welding hose 50’	Goodyear	56961806432707
092	1	Welding hose repair kit	Uniweld	HRK5
093	1	Welding / Cutting torch kit	Victor	0384-2041
094	1	Torch cart	Vestil	CYL-2
095	3	50’ x 3/8” Air Hose	Speedaire	4Z899
096	1	Ground clamp		1UYE9
097	1	Electrode holder		1UYE6
098	6	Welding cable connector		1UYF5
099	1	4 AWG welding cable 250’	Carol	01777.35.01
100	1	Welding rod oven	Dryrod	1200200
101	1	Wire stripper	Jonard	JIC-1022
102	1	Cable cutter	Westward	10D466
103	1	Wire stripper	Westward	1YMZ8
104	1	Ratcheting crimper	Greenlee	45500
105	2	Tool bag	Clc	1163
106	1	Metric tap and die set	Irwin	97312
107	1	Air compressor	Speedaire	4ME99
108	1	150psi Air regulator water separator / oiler combination	Speedaire	7D746
109	1	25 ton hydraulic porta power	Enerpac	MLP25
110	1	Portable Band saw (includes case)	Milwaukee	6232-21
111	1	1/2 Electric drill	Milwaukee	0300-20
112	1	Snap ring Plier set	Knipex	9K 00 19 02 US
113	1	Job site cabinet	Westward	24Y926
114	1	Job box	Westward	24Y944
115	1	Flammable Liquids cabinet	Eagle	PI-62
116	1	7" angle grinder	Bosch	1873-8
117	1	Pneumatic chisel / needle scaler	Speedaire	3AAH6
118	1	Carbide Hole saw kit	Lenox	30878-500CHC
119	1	Bi-Metal Hole saw kit	Lenox	30800600L
120	1	Electric reciprocating saw	Milwaukee	6520-21
121	1	Rivet kit	Pop	PS15-KIT
122	2	1/2" snatch block	Yoke	8-501-04
123	2	3/4" snatch block	Yoke	8-501-08
124	2	1 1/8" snatch block	Yoke	8-501-20
125	4	13,000lbs Shackle	Crosby	1018516
126	8	1,500lbs Shackle	Crosby	1018393
127	4	17,000lbs Shackle	Crosby	1018543
128	4	24,000lbs Shackle	Crosby	1018589
129	8	3,000lbs Shackle	Crosby	1018446

130	8	6,500lbs Shackle	Crosby	1018482
131	3	1600lbs Sling	Lift All	EE1801TFX3
132	4	3200lbs sling	Lift all	EE1802DFX10
133	4	6400lbs sling	Lift all	EE1804NFX13
134	4	9600lbs sling	Lift all	EE1806NFX10
135	1	Hand truck	Little giant	T-360-10
136	1	Bolt bin	Durham	351-95
137	1	Bolt bin	Durham	360-95
138	1	Hydraulic fittings bin	Durham	017-95
139	1	Dumpster	Uline	H-2109
140	1	Wash basin	Swan corporation	PT100000.000
141	1	Barrel rack / spill containment	Little giant	SST-5151-2D
142	1	Stackable drum rack		30YN83
143	2	Grease gun	Westward	15F212
144	1	3/8" impact	Ingersoll rand	2115QTIMAX
145	1	1/2" impact	Ingersoll rand	2135QTIMAX
146	1	3/4" impact	Ingersoll rand	2145QiMAX
147	1	Socket adaptors	Sk professional tools	4518
148	1	Holding screw drivers	Wiha tools	39892
149	1	Multimeter / amp meter kit	Fluke	FLUKE-117/323/WWG
150	1	Insulated nut driver set	Wiha Tools	32291
151	1	Insulated screwdrivers set	Wiha Tools	32092
152	1	Engineers hammer	Council Tool	PR30FG
153	1	Ball peen hammer	Proto	J1316PGD
154	1	Locking pry bar set	Craftsman	87653
155	1	3/8 drive 6point deep metric socket set	Craftsman Industrial	9-24783
156	1	3/8 metric crows foot	SK Professional Tools	42365
157	1	3/8 flex head ratchet	SK Professional Tools	45178
158	1	3/8 offset flex head teardrop ratchet	SK Professional Tools	3770
159	1	3/8 extension set	Proto	J52008
160	1	3/8 ratchet finger spin adapter	SK Professional Tools	45172S
161	1	1/4-3/8" metric combination ratchet wrench set	Blackhawk	9753-B
162	1	Metric combination wrench set	Proto	J1200RM-T500
163	1	Combination wrench set	Proto	J1200FASD
164	1	Ball head allen wrench set	Westward	2CYC7
165	1	Adjustable wrench set	Proto	J790
166	1	Adjustable wrench	Proto	J706L
167	1	Terminal crimper cutters	Klein Tools	1005
168	1	Tin snips straight cut	Wiss	M3X
169	1	Adjustable pliers set	Channellock	VJ-3
170	1	Adjustable pliers	Channellock	480
171	1	Wire stripping crimping tool	Mac Tools	WSC665
172	1	Roto crimping tool	Paladin	PAL-901435
173	1	Mini pliers set	Irwin Vise Grip	2078714

174	1	Mini screw driver set	Moody Tool	58-0670
175	1	Putty knife	Westward	4YP28
176	1	Standard machinist ruler	Starrett	C33H-6-4R
177	1	Metric machinist ruler	Starrett	11MH-300
178	1	SAE/metric tape measure	Milwaukee	48-22-5225
179	1	Punch set	Proto	J46S2
180	5	Small wire brush	Ampco	TB-10
181	1	File set	Nicholson	22150HI
182	1	Drill bit set	Dewalt	DW1969
183	1	Roller tool case	Pelican	0450
184	5	10.6 utility pouch	511 Tactical	58716
185	2	Med tool bag	511 Tactical	58726
186	2	Storage box	Bosch	L-BOXX-2
187	2	Storage box	Bosch	L-BOXX-1
188	1	Storage box	Bosch	L-BOXX-3
189	1	Wire strippers	Klein Tools	11047
190	1	Katapult wire strippers	Ideal	45-092
191	1	Mini screwdriver set 4pc	Klein Tools	85484
192	1	Spud wrench adj 1 5/16	Klein Tools	3227
193	1	Spud wrench adj 1 1/2	Proto	J712SC

14.7.2. Installation of components requiring special tools for maintenance, repair, or inspection shall be minimized.

14.7.3. Special tools are considered any tool not typically included in a mechanical or electrical technicians toolbox, including, but not limited to:

14.7.3.1. Special adjusting tools

14.7.3.2. Spanner wrenches

14.7.3.3. Wrenches in excess of 32mm (1-1/4").

14.7.4. Where the use of special tools cannot be avoided, the Contractor shall supply one (1) set of each special tool stamped to be easily identified for its size and function.

14.8. Tools Container (Option)

14.8.1. An insulated HVAC climate controlled work shop/tool container made from a new and unused ISO 40' shipping container shall be provided as an option and outfitted with the following:

14.8.1.1. Two (2) 72" wide x 30" deep x 34" high maple butcher block safety edge work benches with 1-3/4" top, installed side by side.

14.8.1.1.1. The metal frame construction shall be scratch resistant powder coated with lateral channel bracing. The legs shall be designed with removable duplex knockouts to accept installation of electrical outlets and be shaped and drilled for floor anchoring.

14.8.1.1.2. The kiln dried, electronically glued and sanded butcher block maple top shall be 1-3/4" thick with mineral oil protected finish.

14.8.2. Standard peg board installed along the wall above each work bench from the top of the bench to the top of the container.

14.8.3. One (1) 208VAC 3Ph 60Hz, 100A distribution panel.

14.8.4. One (1) 120VAC 1Ph 60Hz duplex receptacle installed every 1.2m (4 ft) along the wall at an elevation of 1.2m above the floor. Receptacles shall be NEMA 5-20R rated and GFCI protected.

14.8.5. One (1) 120VAC 1Ph 60Hz exterior duplex receptacle installed every 1.8m (6 ft) along the exterior walls of the container. Receptacles shall be NEMA 5-20R rated and GFCI protected and have an "in use" cover.

14.8.6. One (1) 240VAC 3Ph 50A single receptacle installed at a height of 1.2m above the floor positioned above the work bench.

14.8.7. Ten (10) 120VAC LED lamp fixtures (in accordance with 8.32) evenly spaced along the interior of the container to achieve a minimum 400 lux illumination inside the container.

14.8.8. One (1) 36" steel exterior man door located on one wall of the container near the end double doors. The Contractor shall confirm which side of the container shall be outfitted with the door with the Engineer.

14.8.9. Four (4) 36" wide x 18" deep x 72" tall heavy duty shelving cabinets with locking doors which can be removed/relocated (not welded in place).

15. Quality Assurance and Quality Control

15.1. General

15.1.1. The Contractor shall establish a Quality Assurance and Quality control program to ensure that all materials, fabrications, machining, assembly, erection, testing, and all other aspects of manufacture are supplied and conducted in accordance with these Specifications, design drawings, and required codes.

15.1.2. The Contractor shall provide dedicated and qualified supervisors and inspectors to carry out the necessary inspections and document the results for permanent record keeping.

15.1.3. The Contractor shall provide at least one (1) full time quality control inspectors at each site where manufacturing activities are being performed.

15.2. Independent Testing

15.2.1. All material testing, non-destructive weld testing, and bolt torque testing shall be performed by an independent inspection agency subject to approval by the Engineer and hired by the Contractor.

15.2.2. The Board may elect to contract their own Third Party Inspection Agency (TPIA) to verify compliance with Contract on the Board's behalf. The Contractor shall coordinate all activities and inspections with the Board's TPIA and ensure advanced notice is provided for the TPIA to witness inspections in accordance with the ITP without subjecting the project to a delay. The Contractor shall consider these inspections in his project schedule.

15.2.3. The Contractor will be liable for any and all delays or costs associated with rework, disassembly, repeat testing, etc. if proceeding with work prior to the Board's TPIA approval in accordance with the ITP.

15.2.4. The Board's TPIA shall have unrestricted access to all manufacturing locations, mills, shops, etc. in order to freely perform inspections required to ensure compliance with the Contract.

15.2.5. Inspections made by the Board's TPIA do not relieve the Contractor of any responsibility of the quality control requirements.

15.2.6. TPIA personnel are not authorized to make or agree to changes to the Contract or these Specifications without written approval by the Engineer.

15.3. Records

15.3.1. Records of all inspections and quality issues/concerns shall be maintained by the Contractor in electronic format (either prepared electronically or written and legibly scanned).

15.3.2. Bi-weekly inspection reports shall be submitted to the Board to alert the Board of any quality issues throughout manufacturing and to provide an update on manufacturing progress.

15.3.3. Inspection forms and reports shall contain the following information:

15.3.3.1. Contractor's name

15.3.3.2. Project name and number

15.3.3.3. Crane number

15.3.3.4. Component Inspected

15.3.3.5. Inspection type and method

15.3.3.6. Inspection location

15.3.3.7. Inspection date

15.3.3.8. Inspector's signature

15.3.3.9. Comments and remarks

15.3.4. All manufacturer's certificates, welder certificates, radiographic film, etc. shall be submitted to the Board for review.

15.3.5. A progress report shall be submitted monthly to the Board and include digital photographs to document the work performed each month.

15.4. Facilities Provided for the Board's Representative

15.4.1. The Contractor shall provide adequate facilities for the Board's representative at each major facility of manufacturing, at no additional cost.

15.4.2. The Contractor shall provide up to two (2) offices complete with lockable desks, chairs, locking file cabinets, telephones, lighting, convenience outlets, air conditioning, and provisions for telephone service and internet communication.

15.4.3. The Contractors shall allow the use of its cafeteria, when available, for the Board's personnel.

15.5. Subcontractors

15.5.1. The use of subcontractors shall be limited to those as approved in the Contract. The use of any subcontractors beyond those listed in the Contract is strictly prohibited.

15.5.2. Generally, regarding the requirement of this Section, a subcontractor is considered any facility of company that manufactures components according to the Contractor's drawings as opposed to manufacturing their own standard product for use on the Crane.

15.5.3. The Board or its Engineer will have final determination if a supplier or vendor is considered a subcontractor.

15.5.4. The Contractor is responsible for ensuring that the quality control and quality assurance procedures at any approved subcontractor are equal to, or exceed the requirements of the Contractor's own procedures and these Specifications.

15.5.5. The Contractor shall provide one (1) of their qualified personnel to perform regular (daily/weekly as agreed with Board) inspections/oversight at the subcontractor facility during all activities related to this project.

16. Inspection Methods

16.1. General

16.1.1. The Contractor is responsible for performing all inspections to ensure quality control. While other methods may be considered, the following inspection methods are pre-approved by the Board.

16.1.1.1. Visual inspection (VI)

16.1.1.1.1. This type of inspection shall be conducted with the human eye and measuring devices. Verification of proper dimensions, ratings, working space, access, labeling, sizes, and work practices shall be accomplished by this type of inspection.

16.1.1.2. Non-destructive testing/examination (NDT or NDE)

16.1.1.2.1. This type of testing will be used to test welds and material for defects. Acceptable methods of non-destructive testing are as follows:

16.1.1.2.1.1. M.T. - Magnetic Particle Testing

16.1.1.2.1.2. DPT - Dye Penetrant Testing

16.1.1.2.1.3. U.T. - Ultrasonic Testing

16.1.1.2.1.4. X-ray - Radiographic Testing

16.1.1.3. Air tight pressure test

16.1.1.3.1. This test is a pressure test to determine the air and/or watertight integrity of a specified structural member or tank. This test is accomplished by filling a member or tank with air to a pressure of 0.105 kgf/cm2. Upon pressurization, a soap solution is applied to all welded joints, fittings and bolted covers. These joints shall then be visually inspected for evidence of leakage, (soap bubbles). If leaks are discovered in screwed or bolted joints, leakage shall be corrected by tightening until all evidence of soap bubbles disappears. If leaks are discovered in welded joints, the pressure shall be released before repair is initiated. Leaking welds shall be corrected by removing the defective portion of the weld by air arc gouging and rewelding. Painting shall not be accepted as a means to correct leakage in welded joints. After the weld has been repaired, the member or tank shall again be pressurized and testing shall be repeated.

16.1.1.3.2. The testing rig shall include a calibrated pressure gauge, a positive closing valve to shut off the air supply, and a relief valve set at a pressure not to exceed the specified test pressure (0.105 kgf/cm2). A calculated head of water to maintain the test pressure is recommended in lieu of a mechanical relief valve.

16.1.1.4. Water hose test

16.1.1.4.1. This test is used to determine the air and/or watertight integrity of welded joints and fittings in structures that cannot be air tested.

16.1.1.4.2. This test is accomplished by subjecting the test areas to a spray of water from a 38mm diameter hose at a pressure of 3.45 bar. The nozzle of this hose is to be held a maximum of 3m from the test area.

16.1.1.4.3. While the test areas are being subjected to the spray of water, the inspector shall visually inspect the opposite side for evidence of leakage. If leakage is discovered, these shall be corrected by the methods specified under "Air Test" and the test repeated.

16.1.1.5. Air hose test

16.1.1.5.1. This test is to serve as an alternative to the "Water Hose Test". Test areas are to be subjected to an airflow from a 10mm nozzle at 6.2 bar. The nozzle is to be held as close as possible to the test area.

16.1.1.5.2. A soap solution is to be supplied to the test areas opposite the areas subject to the airflow. The inspector shall then inspect for evidence of leakage, (air bubbles). If leakage is discovered, these shall be corrected by the methods specified under "Air Test" and the test repeated.

16.1.1.6. Access hole (man hole) cover chalk test

16.1.1.6.1. This test is to serve as an alternative for testing manhole covers for watertight integrity. This test is to be used on manhole covers where only the covers are required to be tested.

16.1.1.6.2. Chalk is applied to the entire sealing flange edge opposite the gasket. The manhole cover will then be closed and then opened. Upon opening, the inspector shall visually inspect the gasket for a continuous chalk mark. A break in the chalk mark indicates an improper seal. This defect is to be corrected by adjustment.

16.1.1.7. Bolt torque (tension) test

16.1.1.7.1. The Contractor is to utilize the services of an independent testing firm to perform this test. This test is to ensure proper tightening of structural and mechanical fasteners.

16.1.1.7.2. Ten percent (10%) of all critical structural and equipment mounting fasteners, but not less than two (2) fasteners per critical connection, are to be randomly checked for proper pre-tension and torque. This test must be conducted using a Skidmore in conjunction with calibrated torque wrenches.

16.1.1.8. Mounting surface contact test (machinist dye test)

16.1.1.8.1. This test is to verify that adjoining mounting surfaces are in proper contact.

16.1.1.8.2. The test shall be conducted by applying a thin film of blue machinist's dye to one (1) of the adjoining surfaces. The two (2) surfaces shall be joined and separated. The surface that was not coated with dye shall be visually inspected. If this surface is not fully coated, there is improper contact. This defect shall be corrected by approved re-machining or shimming.

16.1.1.9. Fastener mechanical property tests

16.1.1.9.1. The Contractor is to submit all manufacturers' fastener certificates. As verification, the Contractor shall be required to randomly test the fastener system to verify mechanical properties. This testing shall be performed by an independent testing firm commissioned by the Contractor.

16.1.1.9.2. The sample fastener system shall be tested for:

16.1.1.9.2.1. Proof load

16.1.1.9.2.2. Tensile strength

16.1.1.9.2.3. Hardness

16.1.1.9.3. Samples are to be selected at random from each shipping lot and shall include the entire fastener system (the bolt, nut, and washer).

16.1.1.9.4. The quantities of samples to be tested per shipping lot are to be determined as follows:

Quantity in Shipping Lot	Test Qty.
1 – 150	1
151 – 280	2
281 – 500	3
501 – 1,200	5
1,201 – 3,200	8
3,201 – 10,000	13
10,001+	20

16.1.1.10. Supplemental Hardness Testing

16.1.1.10.1. In addition to the test specified in 16.1.1.9, the hardness of one random fastener per connection shall be checked. If the hardness is below tolerance for size and grade, hardness tests on the other fastener systems in the connection shall be checked. If others are found to be below tolerance, proof- loading tests shall be conducted on the "suspect" fastener systems. If any fails the proof loading, the connection fasteners shall be considered rejected.

16.1.1.11. Hydrostatic piping test

16.1.1.11.1. This test is to determine the tightness of piping systems. The piping shall be pressurized with water to one hundred-fifty percent (150%) of the working pressure. Pumps and miscellaneous equipment in the system, which are unable to withstand the test pressure, are to be isolated using blanks.

16.1.1.11.2. Upon attaining the specified test pressure, all joints in the system are to be visually inspected for evidence of leakage. If leakage is discovered, pressure shall be released from the system, and leakage shall be corrected by the methods specified under "Air Test" and the test repeated.

16.1.1.11.3. Alternative test methods shall be considered for compressed air piping.

16.1.1.12. Hydrostatic tank test

16.1.1.12.1. This test is to determine the watertight or oil tight integrity of a tank.

16.1.1.12.2. The tank shall be filled with clean, fresh water until it overflows thru the overflow pipe. This will simulate a full tank. The inspector shall

inspect all welded joints of the tank for evidence of leakage. If leaks are discovered, these shall be corrected by the methods specified under "Air Test" and the test repeated. Prior to correcting any welded joint, the tank shall be completely drained of all water.

16.1.1.13. Electrical tests with the following calibrated equipment, as required.

16.1.1.13.1. Voltmeter

16.1.1.13.2. Ground resistance meter

16.1.1.13.3. Light meter

16.1.1.13.4. Ammeter

16.1.1.13.5. Oscilloscope

16.1.1.13.6. Megger

16.1.1.13.7. High pot tester

16.1.1.13.8. Sound meter

16.1.1.13.9. Thermographic imager

17. Fabrication Inspection & Testing

17.1. General

17.1.1. The Contractor shall develop a complete Inspection and Testing Plan (ITP) specifically tailored to the requirements of these Specifications.

17.1.2. Records of all inspections performed as required in these Specifications shall be submitted to the Board in accordance with Section 15.

17.2. Structural

17.2.1. Materials

17.2.1.1. All structural materials are to be inspected upon receipt for any visual defects and verification of size.

17.2.1.2. All welding electrodes and welding flux container labels are to be inspected for compliance with these Specifications.

17.2.1.3. All structural fasteners are to be inspected upon receipt for any visual defects and verification of type, size, and quantity. Structural fastener mechanical properties shall be tested in accordance with Section 16.

17.2.2. Structural members shall be regularly inspected throughout fabrication for visual defects or damage.

17.2.3. Dimensional verification of structural members shall be performed by the Contractor at each stage of the manufacturing process to confirm compliance with the design drawings and these Specifications.

17.2.4. Ground pre-assembly of all structural components shall be performed to ensure proper fit up of connections (welded, bolted, pin, etc.).

17.2.5. Final inspection of structural components shall be performed after ground pre-assembly prior to releasing each component for painting. The final inspection shall include all required visual, dimensional, alignment, and NDT inspections and tests.

17.2.6. Weld Inspections

17.2.6.1. All weld inspections shall be performed in accordance with AWS D1.1 and requirements for dynamically loaded structures.

17.2.6.2. Full penetration welds

17.2.6.2.1. All full penetration welds (complete joint penetrations) shall be tested by 100% UT.

17.2.6.2.2. All full penetration welds used in tension members and members subject to reverse loading, inclusive of flanges of members in bending, shall also be inspected by x-ray along 20% of its length.

17.2.6.2.3. In the event that defects are discovered, the amount of x-ray length to be inspected shall be increased up to 100% of the weld length at the discretion of the Engineer.

17.2.6.3. Non-full penetration welds

17.2.6.3.1. All welds that are not full penetration welds, including, but not limited to, fillet welds, groove welds, partial penetration welds, etc. in members subjected to a fatigue range exceeding 70% of the maximum allowable stress shall be inspected by MT 100%.

17.2.6.3.2. Where the weld is not accessible for MT, the weld shall be inspected by UT or other method approved by the Engineer.

17.2.7. Structural members designed as air tight, shall be air tested in accordance with 16.1.1.3 after blasting, but prior to applying exterior coatings or coatings to the interior welds. The air test shall be re-performed after all access covers are installed and painting has been completed. The Contractor shall seal weld around the plug after completion of the air test.

17.2.8. All main structural members which are not air tight are to be tested by either water hose testing or air hose testing prior to coating the interior or exterior of the member.

17.2.9. Structural fasteners permanently installed during fabrication shall be tested by the torque test requirements of Section 16.

17.3. Mechanical

17.3.1. Materials

17.3.1.1. Certificates for mechanical components shall be verified upon receipt.

17.3.1.2. Purchased components and machinery shall be inspected upon receipt for any visual defects, damage, and verification of type, model, size, quantity, etc.

17.3.1.3. All castings, forgings, pins, axles, etc. shall be tested by either Ultrasonic Testing (UT) or Radiographic Testing (x-ray) by an independent inspection agency upon receipt.

17.3.1.4. Mechanical property testing shall be performed in accordance with Section 16.

17.3.2. Mechanical components shall be regularly inspected throughout fabrication and machining for visual defects or damage.

17.3.3. Dimensional verification of mechanical components shall be performed by the Contractor at each stage of the manufacturing process to confirm compliance with the design drawings, proper machinist practices, and these Specifications.

17.4. Electrical

17.4.1. Materials

17.4.1.1. All electrical components including wiring, conduit, motors, control panels, transformers, generators, switches, safety devices, etc. shall be visually inspected for defects or damage upon receipt.

17.4.1.2. compliance and conformance with:

17.4.2. Wiring and conduit installation performed during prior to assembly and erection shall be visually inspected for compliance with:

17.4.2.1.1. These Specifications

17.4.2.1.2. Regulatory codes and regulations

17.4.2.1.3. Wiring diagrams

17.5. Corrosion Prevention

17.5.1. Materials

17.5.1.1. All stainless steel components shall be verified as 316 stainless steel. 304 stainless steel is prohibited, except as directly specified in these Specifications. Any reference to stainless steel where 304 is not mentioned implies 316 stainless steel.

17.5.1.2. All blasting, cleaning, painting, thinning, and other materials shall be verified to be in accordance with the approved coating system requirements.

17.5.2. All blasted surfaces shall be inspected visually prior to application of coatings.

17.5.3. Application of each coat shall be visually inspected to verify conformance with these Specifications.

17.5.4. Dry film thickness (DFT) readings shall be taken every $2m^2$ for each coat.

17.5.5. Ten percent (10%) of all readings shall be taken on surfaces which are not easily accessible for coating, such as the backside of angle stiffeners.

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18. Assembly & Erection Testing

18.1. General

18.1.1. The Contractor shall develop a complete Inspection and Testing Plan (ITP) specifically tailored to the requirements of these Specifications.

18.1.2. Records of all inspections performed as required in these Specifications shall be submitted to the Board in accordance with Section 15.

18.1.3. All requirements of Section 17 shall be included in the requirements of this Section.

18.2. Structural

18.2.1. Supplemental hardness testing of structural fasteners permanently installed shall be tested in accordance with 16.1.1.10.

18.3. Mechanical

18.3.1. Installation of all machinery and mechanical components shall be inspected to verify proper mounting, alignment, and support.

18.3.2. Mechanical fasteners installed shall be torque tested in accordance with Section 16.

18.3.3. Supplemental hardness testing of mechanical fasteners permanently installed shall be tested in accordance with Section 16.

18.3.4. All machinery and mechanical components shall be shop tested to demonstrate proper operation before initial start-up and testing begins at the Fabrication Site.

18.3.5. All sheaves, rollers, drums, wheels, and other components using anti-friction bearings or bushings shall be rotated, by hand where practical, to verify proper performance and rotation.

18.3.6. Rope clearances shall be verified during reeving of ropes.

18.4. Electrical

18.4.1. All motors shall be checked for proper rotation and wiring prior to shop testing.

18.4.2. All illumination systems and components shall be shop tested prior to shipping.

18.5. Corrosion Protection

18.5.1. All painted surfaces shall be regularly inspected during assembly and erection. All damages to the coating system shall be properly repaired prior to shipment of the Crane.

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19. Shipment & Sea Transportation

19.1. General

19.1.1. The Contractor shall deliver the Crane in a limited number of subassemblies for final erection at the designated location at the Board's facility.

19.1.2. The Crane's subassemblies shall be loaded at the Contractor's site, safely and properly stowed on the vessel, and transported to the Board's facility for offload and commissioning.

19.1.3. Shipping, sea transportation, sea fastening, and offload submittals shall be provided according to the Section 27.

19.2. Packing & Shipping

19.2.1. The Crane, subassemblies, loose components, spare parts, etc. shall be packaged to protect the components from the environmental conditions of the sea transportation such as sea spray, rain, winds, and ultraviolet exposure. Contractor shall remedy all damages and deficiencies from sea transportation prior to receiving Substantial Completion.

19.2.2. The Crane, subassemblies, loose components, spare parts, etc. shall be secured on the vessel to restrain movement and prevent excessive stresses that may affect the integrity or useful life of the Crane.

19.2.3. All spreaders, spare parts, and tools shall be shipped inside sealed shipping containers.

19.2.4. Where possible for subassembly delivery, all motor heaters shall remain on during transportation.

19.2.5. Based on the configuration for shipping, the Contractor shall analyze the Crane structure for the sea voyage using a global recognized standard for seal voyage criteria and analysis method.

19.3. Crane Weight Verification

19.3.1. Prior to loading the Crane on the vessel for shipping, the Contractor shall verify the as-built weight of the Crane in accordance with 22.11.

19.4. Pre-Shipment Certificate

19.4.1. The Crane, subassemblies, and loose components shall not be loaded on the vessel for transportation until the Contractor has completed the Contract required testing, commissioning, and punchlist resolution and performed a pre-shipment inspection with the Board or the Engineer.

19.4.2. Upon completion of the pre-shipment inspection and after any noted deficiencies have been resolved, the Board will issue a Pre-Shipment Certificate authorizing the Contractor that the Board is in agreement with the readiness for shipping.

19.5. Shipment

19.5.1. Prior to departure of the vessel, the Contractor shall provide the final voyage plan including schedule, route, ETA, etc.

19.5.2. From the day of departure of the vessel until the day of arrival at the Board's facility, the Contractor shall provide records of the vessel progress to the Engineer which include vessel coordinates, average speed, sea conditions, ambient conditions, status/condition of the cargo, ETA, and general comments.

19.5.3. The Contractor is responsible for the coordination and scheduling of vessel arrival and berthing with the United States Coast Guard, the Mississippi River Pilots Association, and the Board's berthing manager.

19.6. Offload

19.6.1. The Contractor is responsible for all costs and coordination of the offload and transportation of the Cranes or subassemblies from the berth to the yard or other means of delivery to the Board's facility.

19.6.2. Submittals

19.6.2.1. The Contractor shall submit the offloading plan and maximum wharf, runway, and yard loadings imposed by the Crane, subassemblies, transportation equipment, erection cranes, and any other equipment to be used on site according to 27.

19.6.3. Approvals

19.6.3.1. The Contractor shall notify and receive approval from the Engineer of any changes to the proposed loading configurations, schemes, or maximum loading prior to implementing changes from the reviewed submittals.

19.6.4. Pre-arrival meeting

19.6.4.1. Up to three (3) days prior to the Contractor mobilizing at the Erection Site or five (5) days prior to vessel arrival, whichever comes first, the Contractor shall coordinate a site kickoff meeting at the Board's office to discuss vessel arrival, offload, erection, testing and commissioning activities.

19.6.4.2. The Contractor's project manager, site manager, project engineer, QA/QC lead personnel, sub-contractor managers, etc. are in attendance for this meeting.

20. Delivery Inspection

20.1. General

20.1.1. Upon delivery of the Crane to the Erection Site, the Contractor shall perform a thorough inspection of all structural, mechanical, and electrical components and submit the findings to the Engineer for review.

20.2. Structural

20.2.1. The Crane structural components shall be inspected for any damage upon arrival at the Erection Site.

20.2.2. Sea fastening or sea bracing attachments shall be visually inspected for cracks, distortion, bending, buckling, or other defect which may impair the integrity of the Crane or its components for offloading.

20.2.3. Fastener systems shall be inspected for loose, broken, or missing fasteners prior to offload.

20.2.4. Torque testing shall be performed on all fastener systems on the Crane after offload.

20.3. Mechanical

20.3.1. All machinery and mechanical components shall be visually inspected for damage or movement during transport.

20.3.2. Fastener systems shall be inspected for loose, broken, or missing fasteners prior to offload.

20.3.3. Torque testing shall be performed on all fastener systems on the Crane after offload.

20.4. Electrical

20.4.1. All electrical equipment, wiring, conduit, and electronics shall be inspected for damage after offload.

20.4.2. Any electrical systems to be used as part of the offload method shall be tested for proper operation prior to offload.

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21. Final Erection & Startup Services

21.1. General

21.1.1. The Contractor shall deliver the Crane in a limited number of subassemblies for final erection at the designated location at the Board's facility.

21.2. Final Erection

21.2.1. The Contractor shall perform final erection of the Crane in an area provided by the Board at the Board's facility.

21.2.2. Final erection generally consists of:

21.2.2.1. Offloading and transporting the Crane and components to the Erection Site

21.2.2.2. Removing shipping support, sea fastening bracing, and other attachments

21.2.2.3. Performing final assembly of the Crane components

21.2.2.4. Making final adjustments

21.2.2.5. Performing touch up painting

21.2.2.6. Resolving all remaining NCR, quality memos, and punchlist items.

21.2.2.7. Performing final testing and commissioning activities

21.2.2.8. Obtaining required certifications

21.2.2.9. Final cleanup

21.2.3. Except for repair of damage components, field welding shall be minimized. All field welding required for final assembly and erection shall be identified in the design review period submittal process.

21.2.4. Prior to repair of any damaged components, the Contractor shall submit proposed repair methods to the Engineer.

21.2.5. The Contractor shall obtain all permits required to offload, install and test the Crane at the Erection site.

21.2.6. The Contractor is responsible for obtaining all personnel access and escorting requirements, security, fire watch, hot work permits, utilities, and all other tools and supplies required for final Erection.

21.2.7. The Contractor shall provide a full time, qualified Erection engineer and Quality Control engineer who shall be responsible for the offload, assembly, erection, testing, certification of the Crane is performed in accordance with the Contractor's approved methods and the requirements of these Specifications. One representative can carry out both responsibilities provided that he/she is qualified for each role and has experience with crane erection, startup, and commissioning

21.3. Control System Engineer

21.3.1. A qualified commissioning engineer from the control system manufacturer shall be on site full time at the Erection Site during all final installation, testing, and commissioning.

21.3.2. After substantial completion, the commissioning engineer shall remain on site for the first sixty (60) days of initial operations.

21.4. Major Component Supplier Representatives

21.4.1. Representatives from major component suppliers shall be onsite for any required final commissioning or certification of the components.

21.4.2. As a minimum, representatives for the following components shall verify the installation and performance of components at the Erection Site:

21.4.2.1. MV cable reel

21.4.2.2. Control system

21.4.2.3. Diesel generator system

21.4.2.4. Main function brakes

21.4.2.5. Spreaders

21.4.3. In lieu of the requirement for a representative of the major component suppliers to be on site for commissioning, the Contractor may utilize his own personnel after submitting the Board and Engineer documentation from the major component supplier confirming the names and trade of the Contractor's personnel who are qualified/certified to commission their equipment.

22. Acceptance & Performance Testing

22.1. General

22.1.1. Prior to start of acceptance and performance testing at both the Fabrication Site and the Erection Site, all systems must be functional and complete as agreed upon based on the method of transportation.

22.1.2. All major system components shall be commissioned by a representative from the manufacturer per Section 11. This includes, but is not limited to, the control system, brakes, spreaders, cable reels, etc. Commissioning of these components shall be performed at the Fabrication Site and the Erection Site.

22.1.3. The Contractor shall prepare and submit test procedures for all required tests and such tests shall prove compliance with these Specifications.

22.1.4. The Contractor shall prepare:

22.1.4.1. Fabrication Site Test & Checkout Manual – Inclusive of all the tests to be performed at the Fabrication Site. The Pre-shipment certificate will not be issued if this manual has not been successfully completed. Details of the required testing will be agreed upon dependent on the method of transportation.

22.1.4.2. Erection Site Test & Checkout Manual – Inclusive of all the tests to be performed at the Erection Site. The Substantial Completion certificate will not be issued if this manual has not been successfully completed.

22.1.5. During all tests, the following data shall be recorded:

22.1.5.1. Date

22.1.5.2. Time

22.1.5.3. Ambient temperature

22.1.5.4. Relative humidity

22.1.5.5. Wind speed

22.1.5.6. Wind direction

22.2. Safety

22.2.1. The Crane shall be operated without load in each mode at full rated speed to verify functionality of all limit switches, such as slow down switches, normal stop switches, over travel switches, interlock lights, alignment switches, calibration switches, etc.

22.2.2. These tests shall be performed at both the Fabrication Site and at the Erection Site.

22.2.3. Details of the required testing will be agreed upon dependent on the method of transportation.

22.3. Speed, Acceleration, & Power

22.3.1. The Contractor shall verify the speed, acceleration, and power of each main system in each operating mode.

22.3.2. A record of the measured voltage, amperage of the drive motors, speeds, accelerations, etc. shall be taken during these tests. Chart recordings shall be provided for each test.

22.3.3. Without load (empty spreader), run all motions independently at full speeds to their limits of travel relying only on the limit switches to slow down and stop each motion.

22.3.4. Bypass the normal slow down and stop limit switches and perform full speed tests, without load, relying only on the over travel limit switches to stop each motion.

22.3.5. With full rated load, run all motions independently at full speeds to their limits of travel relying only on the limit switches to slow down and stop each motion.

22.3.6. Perform rated load and overload tests as required for US OSHA certification.

22.3.7. These tests shall be performed at both the Fabrication Site and at the Erection Site.

22.3.8. Details of the required testing will be agreed upon dependent on the method of transportation.

22.4. Cycle Time

22.4.1. The Crane shall operate in each operating mode with full rated load and follow the theoretical duty cycle path per 4.6 for a minimum of one (1) continuous hour.

22.4.2. At any point during the test, should down time occur, the one (1) hour period shall be re-started.

22.4.3. Record of the measured voltage, amperage of the drive motors, speeds, accelerations, etc. shall be taken during these tests. Chart recording shall be provided for each test.

22.4.4. The cycle time tests shall be completed prior to performing the endurance test.

22.4.5. These tests shall be performed at both the Fabrication Site and at the Erection Site.

22.4.6. Details of the required testing will be agreed upon dependent on the method of transportation.

22.5. Endurance

22.5.1. The Crane shall be operated through cycles of moving containers of placing and removing containers at full rated load through a simulation of typical operations. The operation sequence shall be generally as follows:

22.5.1.1. Lower the empty spreader onto a rated load container in the truck lane.

22.5.1.2. Lock the spreader on the container

22.5.1.3. Hoist and travel to the trolley to railroad track P3 position

22.5.1.4. Lower the container to the ground and unlock spreader

22.5.1.5. Hoist empty spreader and travel to railroad track P1 position

22.5.1.6. Lower the empty spreader onto a rated load container

22.5.1.7. Lock the spreader on the container

22.5.1.8. Hoist and travel to the truck lane

22.5.1.9. Lower the container to the ground and unlock spreader

22.5.1.10. Hoist up 3m

22.5.1.11. Lower the empty spreader onto a rated load container in the truck lane.

22.5.1.12. Lock the spreader on the container

22.5.1.13. Hoist and travel to the trolley to railroad track P1 position

22.5.1.14. Lower the container to the ground and unlock spreader

22.5.1.15. Hoist empty spreader and travel to railroad track P3 position

22.5.1.16. Lower the empty spreader onto a rated load container

22.5.1.17. Lock the spreader on the container

22.5.1.18. Hoist and travel to the truck lane

22.5.1.19. Lower the container to the ground and unlock spreader

22.5.1.20. Hoist up 6m

22.5.1.21. Gantry 12.2m and repeat.

22.5.2. The above cycle shall be repeated for a minimum of twelve (12) hours with the last eight (8) hours operating with no faults or lost time.

22.5.3. At any point during the last eight (8) hours of the test, should down time occur, the final eight (8) hour period shall be re-started.

22.5.4. A record of the measured voltage, amperage of the drive motors, speeds, accelerations, etc. shall be taken during these tests. Chart recording shall be provided for each test.

22.5.1. These tests shall be performed at both the Fabrication Site and at the Erection Site.

22.5.2. Details of the required testing will be agreed upon dependent on the method of transportation.

22.6. Structural

22.6.1. Alignment of the Crane structure, rails systems, etc. shall be verified prior to beginning acceptance and performance testing.

22.6.2. Verify the trolley rail gage, elevation, levelness, and straightness.

22.6.3. Verify the gantry tire gage.

22.6.4. Measure deflections of the girders.

22.6.5. These tests shall be performed at both the Fabrication Site and at the Erection Site.

22.6.6. Details of the required testing will be agreed upon dependent on the method of transportation.

22.7. Mechanical Systems

22.7.1. All mechanical systems and machinery shall be tested prior to any operational or performance testing to verify compliance with these Specifications.

22.7.2. These tests shall be performed at both the Fabrication Site and at the Erection Site.

22.7.3. Details of the required testing will be agreed upon dependent on the method of transportation.

22.8. Electrical Systems

22.8.1. All electrical system tests shall be performed prior to any operational or performance testing to verify compliance with these Specifications and in accordance with NETA ATS standards.

22.8.2. As deemed necessary by the Engineer, equipment covers shall be removed for inspection of internal wiring.

22.8.3. Verify that all taps on transformers are set to provide the voltage indicated in these Specifications using a calibrated voltmeter.

22.8.4. Test each grounding point after all connections to ground points are made but prior to grounding conductor connection is made to the frame. Ground point installations shall be tested by “fall of potential” measuring method using ground resistance test meter.

22.8.5. All electrical equipment and systems shall be tested to verify proper operation including, but not limited to:

22.8.5.1. Maintenance Lockouts

22.8.5.2. Communication equipment

22.8.5.3. Signals, alarms, and bypasses

22.8.5.4. Safety systems, such as overload protection, anemometer, and over travel

22.8.5.5. Auxiliary systems such as CCTV

22.8.5.6. Power factor correction and harmonic filtering equipment (if determined necessary)

22.8.5.7. Motor vibration (if determined necessary)

22.8.5.8. Diesel-generator

22.8.6. These tests shall be performed at both the Fabrication Site and at the Erection Site.

22.8.7. Details of the required testing will be agreed upon dependent on the method of transportation.

22.9. Illumination

22.9.1. Illumination readings shall be recorded in all locations to verify the requirements of these Specifications are satisfied in all work areas, along access systems, in maintenance areas, etc.

22.9.2. Readings shall be taken with all machinery in operation, during overnight hours, without facility lighting, and without trolley flood lights.

22.9.3. Access illumination readings shall be performed with all main floodlights off.

22.9.4. These tests shall be performed at the Fabrication Site or at the Erection Site.

22.9.5. Details of the required testing will be agreed upon dependent on the method of transportation.

22.10. Heating, Ventilation, & Air Conditioning (HVAC)

22.10.1. HVAC systems functionality shall be verified in accordance with the requirements of these Specifications.

22.10.2. Performance of the electrical house HVAC system shall be tested and recorded during the endurance testing.

22.10.3. These tests shall be performed at both the Fabrication Site and at the Erection Site.

22.10.4. Details of the required testing will be agreed upon dependent on the method of transportation.

22.11. As-Built Weight & Center of Gravity

22.11.1. Prior to loading the Crane on the vessel for shipping, the Contractor shall verify the as-built weight of the Crane using calibrated electronic load cells and performed by an independent third party.

22.11.2. The as-built dead weight and corner load distribution shall be measured in the following Crane positions.

22.11.3. Trolley parked

22.11.4. Trolley mid-span

22.11.5. Trolley max span
22.11.6. The Crane shall be weighed three (3) times in each position, and the average of these three recordings used for as-built weights and center of gravity.
22.11.7. After the as-built weights and center of gravity are confirmed, the as-built weighing report shall be submitted to the Board.
22.11.8. The as-built weights shall be used to revise the wheel load and stability calculations which are to be submitted to the Board as final as-built documentation.
22.11.9. For fully erect delivery, this test shall be performed at the Fabrication Site; otherwise it shall be performed at the Erection Site.

22.12. Natural Frequency

22.12.1. The Contractor shall measure and record the natural frequency of the Crane in both the trolley and gantry directions.

22.12.2. The Crane shall be operated within the limits of normal operation to induce the maximum sway of the Crane. The measurement of the natural frequency shall be measured with an accelerometer positioned in the operator's cabin.

22.12.3. These tests shall be performed at the Erection Site.

22.13. Yard Interface

22.13.1. The Contractor shall verify that the Crane interfaces with all aspects of the Erection Site.

22.13.2. As a minimum, the Contractor shall verify the interface of:

22.13.2.1. Gantry runway

22.13.2.2. Gantry tie downs

22.13.2.3. MV cable power terminal box position

22.13.2.4. Any other securing devices

22.13.2.5. Any end of travel limits

22.13.3. These tests shall be performed at the Erection Site.

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23. Certification

23.1. General

23.1.1. The Contractor shall be responsible for obtaining all certifications and certificates required by all governing regulatory agencies.

23.1.2. A copy of all certifications shall be provided to the Owner prior to Substantial Completion.

23.1.3. All certifications described in this Section shall be provided even if it is determined that they are not required by regulatory agencies.

23.2. OSHA

23.2.1. An inspector licensed to certify cranes in accordance with the United States Department of Labor division of Occupational Safety & Health Administration (OSHA) must perform a complete inspection of the Crane.

23.2.2. The OSHA inspection shall include inspection and certification of the Crane, all lifting system components, and all service cranes.

23.3. Spreader & Twistlocks

23.3.1. The Contractor shall provide certifications from the Spreader manufacturer to confirm load tests were performed in accordance with the Spreader design.

23.3.2. Twistlock certificates shall be provided for each twistlock provided on the spreader and as spare parts inventory.

23.3.3. Spreaders shall be verified for mechanical and electrical interchangeability with the Board's existing STS cranes and STS45 spreaders.

23.4. Service Cranes

23.4.1. Each service crane shall be certified for the 125% of the rated load.

23.4.2. Trolleys, winches, and other lifting attachments provided on the service cranes shall be provided with certificates from the manufacturer.

23.5. Wire Rope

23.5.1. Wire rope certifications shall be provided for each wire rope installed on the Crane and provided as spare parts inventory.

23.6. Air Compressors

23.6.1. Air receiver and compressor certifications shall be provided for each unit on the Crane.

23.7. Diesel Generator

23.7.1. The diesel generator unit shall be certified per the United States Environmental Protection Agency (EPA) and other regulatory requirements.

23.7.2. The diesel generator shall be certified for the noise level requirements of these Specifications.

23.8. Underwriter's Laboratory (UL)

23.8.1. All electrical components shall be provided with UL certification.

23.8.2. Any other components required in these Specifications to meet the requirements of UL shall be provided with UL certification.

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24. Final Inspection & Punchlist

24.1. Final Inspection

24.1.1. Upon successful completion of the acceptance and performance tests as well as all certification tests, the Engineer shall perform a final inspection of the Crane. The inspection shall identify remaining work, missing parts/components, defects, damage, and any other Contract deficiencies.

24.1.2. The Contractor shall be present with the Engineer during this inspection in order to ensure proper understanding of each issue raised by the Engineer.

24.2. Final Punchlist

24.2.1. A final punchlist will be issued after completion of this inspection.

24.2.2. The final punchlist will consist of any/all remaining punchlist items from the punchlist developed throughout the manufacturing, testing, and commissioning of the Crane as well as any items discovered during the final inspection.

24.2.3. Substantial completion will not be considered until the Contractor, the Board, and the Engineer agree upon the final punchlist.

24.2.4. Final completion will not be considered until the entire final punchlist has been completed to the satisfaction of the Engineer.

24.2.5. The Contractor shall verify completion of all final punchlist items before requesting a follow up inspection by the Engineer.

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25. Documentation

25.1. General

25.1.1. All documentation shall be provided in pdf format.

25.1.2. All documentation shall be provided in English.

25.1.3. Documents shall be clean legible documents of minimum file size.

25.1.4. Document file names shall provide the document name, revision, and description in a format consistent with the requirements of Section 27.

25.1.5. Final documentation shall be provided on a DVD or volume of DVDs as required. The complete documentation shall include a table of contents which directs the user to the location and name of the desired document.

25.2. Testing Records

25.2.1. All testing records from every stage of manufacturing, testing, and commissioning shall be provided to the Board.

25.2.2. These records shall include all measurements, check lists, chart recordings, fault logs, printouts, certificates, etc.

25.2.3. Test results shall include, but is not limited to, items such as material certifications, alignment checks, weld inspections, dimensional verification, oil samples, and electrical tests.

25.3. Operation Manual

25.3.1. A complete manual for the operation of the Crane shall be provided.

25.3.2. The manual shall be written from the operator's perspective and include the instructions for the safe and proper use of the Crane and all of its functions, options, and auxiliary features which are in accordance with all required codes and regulations.

25.3.3. The manual shall include an overview of all operating modes, motions, options, and auxiliary features.

25.3.4. The manual shall include step-by-step instruction and descriptions for all functions including:

25.3.4.1. Start-up and shut-down of the Crane.

25.3.4.2. Operating modes

25.3.4.3. Travel motions

25.3.4.4. Spreader functions and control

25.3.4.5. All indicating lights & alarms

25.3.4.6. All control panels

25.3.4.7. Wind alarm system & control logic for each alarm

25.3.4.8. Illumination systems

25.3.4.9. All optional and auxiliary features including, but not limited to:

25.3.4.9.1. Auto-steering

25.3.4.9.2. CCTV

25.3.4.9.3. Trim & skew

25.3.4.9.4. HVAC systems

25.3.5. Review of the operation manual shall be verified during the testing, commissioning, and training activities at the Erection Site.

25.3.6. The Contractor shall provide twenty five (25) bound weatherproof copies of the instruction, approximately 150mm x 225 prior to Final Completion.

25.3.7. A full size bound weatherproof/laminated set of instructions shall be included in the operator's cabin of the Crane with a dedicated storage location.

25.4. Maintenance Manual

25.4.1. A complete manual for the maintenance of the Crane shall be provided.

25.4.2. The manual shall be written from the maintenance technician's perspective and include the instructions for the safe and proper care, maintenance, and troubleshooting of the Crane and all of its functions, options, and auxiliary features which are in accordance with all required codes and regulations to maximize the service life of the Crane, its components, and its systems.

25.4.3. The complete maintenance manual shall include:

25.4.3.1. Maintenance task and troubleshooting instructions for:

25.4.3.1.1. All main and auxiliary operations

25.4.3.1.2. Crane power supply conversion (Diesel genset / MV cable switching)

25.4.3.1.3. Diesel genset operation & maintenance

25.4.3.1.4. Emergency operations

25.4.3.2. Parts lists (spare parts)

25.4.3.2.1. A complete list of all parts/components used on the Crane shall be provided in accordance with Section 29.

25.4.3.3. Purchased components

25.4.3.3.1. Supplier contact info and component details

25.4.3.3.2. Supplier operating & maintenance instructions

25.4.4. The manual shall include descriptions and each maintenance task and step-by-step instructions required for all systems on the Crane, including those required by manufacturers of components used on the Crane.

25.4.5. For each maintenance task, the following information shall be provided:

25.4.5.1. Task description

25.4.5.2. Frequency

25.4.5.3. Parts, and materials required

25.4.5.4. Step-by-step instruction with diagrams, charts, graphics, and other visual aids

25.4.5.5. Setting values, when required (i.e. bolt torque, brake torque, air pressure, etc.)

25.4.5.6. Key areas of inspection

25.4.6. Lists of all maintenance tasks shall be provided, organized with table of contents grouping similar tasks by:

25.4.6.1. Type – Such as: lubrication, brakes, couplings, ropes, cleaning, tires & wheels, etc.

25.4.6.2. Frequency – Such as: daily, weekly, monthly, semi-annually, annually, number of hours, etc.

25.4.6.3. System – Such as: main hoist, trolley drive, gantry drive, diesel generator, CCTV, etc.

25.5. Structural Inspection Manuals

25.5.1. A structural inspection manual consistent with the formatting and reporting of the Board's existing structural inspection manuals shall be provided for the Crane and all lifting system components.

25.5.2. The manual shall include:

25.5.2.1. Inspection intervals

25.5.2.2. Inspection locations

25.5.2.3. Inspection methods and procedures

25.5.2.4. Reporting procedures

25.5.2.5. Repair procedures

25.5.3. The inspection programs shall be based on the facture mechanics principles.

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26. Acceptance

26.1. General

26.1.1. Board acceptance of the Crane, its progress, or readiness/completion of various stages of the project will be solely by issuance of a certificate as described in this Section.

26.1.2. Unless a certificate has been provided to the Contractor, acceptance is not granted or implied regardless of whether it is provided verbally, in writing, or otherwise communicate by any of the Board's personnel or the Engineer.

26.2. Pre-shipment Certificate

26.2.1. The Board will issue a Pre-Shipment certificate once the Contractor has satisfied the requirements in accordance with 19.4.

26.2.2. Loading of the Crane for shipment shall not commence until the Contract has been provided the signed Pre-shipment Certificate.

26.3. Substantial Completion Certificate

26.3.1. The Crane will be considered as substantially complete and ready for commercial operations when the following criteria have been completed to the satisfaction of the Engineer:

26.3.1.1. All testing and commissioning requirements of these Specifications have been successfully completed and verified by the Engineer.

26.3.1.2. All certifications have been provided to the Board and the Engineer.

26.3.1.3. The following quality issues have been resolved to the Engineer's satisfaction:

26.3.1.3.1. Non-Conformance Reports (NCRs)

26.3.1.3.2. Quality memos

26.3.1.3.3. Safety and operational punchlist items

26.3.1.3.4. Other punchlist items as identified by the Engineer

26.3.1.4. Delivery of spare parts and tools have been verified.

26.3.1.5. Operator and maintenance training has been completed.

26.3.2. Once the above requirements have been completed to the Engineer's satisfaction, the Board will issue a signed Substantial Completion certificate.

26.3.3. Upon Contractor acceptance of Substantial Completion:

26.3.3.1. The Crane will be handed over to the Board for commercial operations

26.3.3.2. The Ownership of the Crane will transfer to the Board, and the Contractor will be required to schedule time to complete any remaining issues around the operations schedule.

26.4. Final Completion Certificate

26.4.1. The Crane will be considered as finally complete when the following criteria have been completed to the satisfaction of the Engineer:

26.4.1.1. All requirements for Substantial Completion have been completed and the Substantial Completion certificate has been submitted by the Board and accepted by the Contractor.

26.4.1.2. All remaining punchlist items have been resolved.

26.4.1.3. The spare parts container (if provided) organization system is complete and verified.

26.4.1.4. As-built documents in accordance with Section 25 have been delivered and verified.

26.4.1.5. All testing reports and quality documents have been delivered.

26.4.1.6. As-built operator and maintenance instructions have been delivered.

26.4.2. Once the above requirements have been completed to the Engineer's satisfaction, the Board will issue a signed Final Completion certificate.

26.4.3. Upon Contractor acceptance of Final Completion:

26.4.3.1. The Crane is considered complete with no outstanding items whatsoever.

27. Submittals

27.1. General

27.1.1. In order to demonstrate specification compliance, the Contractor shall submit the documentation provided in the Specifications for the Board's and Engineer's review.

27.1.2. The Contractor is responsible for the design of the Crane.

27.1.3. All calculations shall be prepared, reviewed, approved, and stamped by a qualified professional engineer(s) in the branch of engineering required for each aspect of the Crane design. The engineer shall be either registered in the country of the Contractor's manufacture or in the USA.

27.1.4. The Board & Engineer will review the documents for general specification compliance, design concept, maintenance and accessibility, and application of sound engineering principles and practice. Lack of comments provided or return of documents without stated exceptions does not relieve the Contractor from meeting the requirements of these Specifications.

27.1.5. Deviations from these Specifications included on submitted documents without specific request for deviation do not relieve the Contractor of meeting the requirements of these Specifications nor constitute acceptance of such deviations.

27.2. Submittal Process

27.2.1. The Contractor shall electronically submit all required documents for review by the Board and the Engineer according to the described submittal process.

27.2.2. All submittal packages shall contain a transmittal sheet that contains the following information:

27.2.2.1. Contractor's name and contact information

27.2.2.2. Project name and Contractor's project number

27.2.2.3. Submittal number (sequential numbering based on order of submittals)

27.2.2.4. Submittal date

27.2.2.5. Table of documents submitted which includes:

27.2.2.5.1. Document number

27.2.2.5.2. Document revision number/letter

27.2.2.5.3. Document title/description

27.2.3. The transmittal cover sheet shall be provided in Microsoft Word format with the table of documents created using the embedded table function of Microsoft Word.

27.2.4. All submittals shall be in high quality, pdf format of reasonable file sizes.

27.2.5. Every document submitted shall have a document number that follows a standard, simple, and logical format. Documents submitted without an appropriate document number will not be reviewed. The Contractor shall provide a document tree demonstrating the format of the document naming convention.

27.2.6. Every submittal shall include a cover page with the following information:

27.2.6.1. Contractor's name

27.2.6.2. Project name and Contractor's project number

27.2.6.3. Document number

27.2.6.4. Document revision number/letter

27.2.6.5. Document title/description

27.2.6.6. Submittal date

27.2.7. On every page of the submittal, the document number, revision, and date shall be provided at the top of the submittal and page number (format: Page X of Y) shall be at the bottom.

27.2.8. All submittals shall be written in English.

27.2.9. Submittals may or may not be reviewed by the Board or the Engineer. If the submittal or notification of submittal review is not provided within two weeks of sending the submittal, the Contractor may consider the submittal as not reviewed by the Board or the Engineer.

27.2.10. All submittals are to demonstrate compliance with these Specifications.

27.2.11. Documents shall be submitted in logical groupings (i.e. submit mechanical system drawings with the same systems calculations).

27.2.12. Deviations

27.2.12.1. Deviations to these Specifications will not be approved through the submittal process.

27.2.12.2. Deviations included in the submitted documents, with or without comments from the Board or the Engineer do not constitute approval of the deviation.

27.2.12.3. Any deviations that the Contractor would like the Engineer to consider for approval must be submitted in writing. The Engineer will respond to each request in writing with either acceptance or rejection or request for further information. The Engineer's decisions are final.

27.2.12.4. Each deviation should be submitted in a format similar to document submittals and include:

27.2.12.4.1. A deviation request number

27.2.12.4.2. Request date

27.2.12.4.3. Deviation description

27.2.12.4.4. Reason for the request

27.2.12.4.5. Supporting documentation (as necessary)

27.2.12.5. The Engineer will maintain a deviation request log.

27.2.12.6. Deviations which have not been approved according to this Section that are discovered during any phase of the project will be rejected even if they are shown in the submittal documents.

27.2.13. Reviewed submittals will be signed, dated, and returned to the Contractor with marked up notes/comments on each document. Reviewed submittals will be identified as:

27.2.13.1. No comments – Do not resubmit unless the design/calculation/etc. changes.

27.2.13.2. Make correction noted – Make the corrections as noted, but do not re-submit.

27.2.13.3. Revise and resubmit – Make the correction as noted and re-submit for review.

27.2.13.4. Rejected – Correct submittal and re-submit.

27.2.14. Submitted documents will generally be reviewed within 14 calendar days; however, occasionally some submittals may take more time to review.

27.2.15. The Contractor should indicate if any submittal requires expedited review, and the Engineer will attempt to meet any reasonable request.

27.2.16. Some drawings will be required to be submitted in AutoCAD format including Crane general arrangement, yard interface drawings, etc. The Engineer will limit the request for AutoCAD format to those drawings necessary for coordination with other facility activities and requirements. The Contractor shall provide AutoCAD format when requested.

27.3. Calculations

27.3.1. All design calculations shall be submitted for review. As a minimum, the following calculations shall be submitted for review. If other calculations are required for the Contractor's design, they should be submitted.

27.3.1.1. Design Codes

27.3.1.2. Wheel Load & Stability

27.3.1.2.1. Safety factor criteria

27.3.1.2.2. Dead weight calculation of components

27.3.1.2.3. Wind load calculations

27.3.1.2.3.1. Surface area

27.3.1.2.3.2. Wind pressure

27.3.1.2.3.3. Coefficients

27.3.1.2.3.4. Wind tunnel results

27.3.1.2.4. Gantry corner, tire, & runway load

27.3.1.2.5. Trolley wheel load

27.3.1.2.6. Operating & stowed stability

27.3.1.2.7. Gantry tie-down

27.3.1.2.8. As-built wheel load

27.3.1.2.9. As-built operating & stowed stability

27.3.1.3. Structural Calculations

27.3.1.3.1. Design criteria

27.3.1.3.2. Gantry components

27.3.1.3.3. Main structural frame

27.3.1.3.4. Trolley

27.3.1.3.5. Headblock

27.3.1.3.6. Spreader

27.3.1.3.7. Connections

27.3.1.3.8. Access systems

27.3.1.3.9. Cabins and houses, including supports

27.3.1.3.10. Tie-downs

27.3.1.3.11. Natural Frequency

27.3.1.3.12. Fatigue

27.3.1.3.12.1. Design code

27.3.1.3.12.2. Design criteria

27.3.1.3.12.3. Duty cycle

27.3.1.3.12.4. Stress of all members, connections, etc.

27.3.1.4. Mechanical Calculations

27.3.1.4.1. Gantry drive system

27.3.1.4.2. Gantry components

27.3.1.4.3. Main hoist drive system

27.3.1.4.4. Main hoist components

27.3.1.4.5. Trolley drive system

27.3.1.4.6. Trolley Components

27.3.1.4.7. Motors

27.3.1.4.8. Reducers

27.3.1.4.9. Couplings

27.3.1.4.10. Brakes

27.3.1.4.11. Bearings

27.3.1.4.12. Shafts

27.3.1.4.13. Sheaves

27.3.1.4.14. Drums

27.3.1.4.15. Pillow blocks

27.3.1.4.16. Wheels/tires

27.3.1.4.17. Wire rope

27.3.1.4.18. Trim and skew system

27.3.1.4.19. Maintenance hoist

27.3.1.4.20. Anti-sway

27.3.1.4.21. HVAC

27.3.1.5. Electrical Calculations

27.3.1.5.1. MV cable reel

27.3.1.5.2. MV cable

27.3.1.5.3. Diesel generator

27.3.1.5.4. Conduit & wire sizing

27.3.1.5.5. Power consumption

27.3.1.5.6. All motor sizing

27.3.1.5.7. Load monitoring system

27.3.1.5.8. Illumination

27.3.1.5.9. Transformers

27.3.1.6. Miscellaneous Calculations

27.4. Drawings

27.4.1. All design drawings shall be submitted for review. As a minimum, the following drawings shall be submitted for review. If other design drawings are required for the Contractor's design, they should be submitted.

27.4.1.1. Arrangements

27.4.1.1.1. Crane general

27.4.1.1.2. Yard interface

27.4.1.1.3. Main hoist system

27.4.1.1.4. Trolley

27.4.1.1.5. Trolley drive system

27.4.1.1.6. Gantry

27.4.1.1.7. Operator's cabin

27.4.1.1.8. Operator's cabin console

27.4.1.1.9. Trim & skew system

27.4.1.1.10. Headblock

27.4.1.1.11. Spreader

27.4.1.1.12. Cable reel

27.4.1.1.13. Electrical house

27.4.1.1.14. Diesel generator

27.4.1.1.15. Illumination

27.4.1.1.16. Access systems

27.4.1.1.17. CCTV system

27.4.1.1.18. Coating system

27.4.1.1.19. Logo & signage

27.4.1.2. Structural

27.4.1.2.1. Main structural frame

27.4.1.2.2. Trolley structural frame

27.4.1.2.3. Electrical house structure and support

27.4.1.2.4. Diesel generator enclosure and support

27.4.1.2.5. Gantry equalizer structural frame

27.4.1.2.6. Gantry yokes

27.4.1.2.7. Gantry tie-down devices

27.4.1.2.8. Headblock

27.4.1.2.9. Spreaders

27.4.1.2.10. Operator's cabin & support

27.4.1.2.11. Access system & attachments

27.4.1.2.12. Bracket layout (note: all brackets must be installed prior to painting)

27.4.1.3. Mechanical

27.4.1.3.1. Main hoist drive system & components

27.4.1.3.2. Main hoist sheaves

27.4.1.3.3. Main hoist reeving

27.4.1.3.4. Anti-sway

27.4.1.3.5. Trolley drive system & components

27.4.1.3.6. Trolley wheels & axles

27.4.1.3.7. Trolley rail system

27.4.1.3.8. Trim & skew system & components

27.4.1.3.9. Gantry drive system & components

27.4.1.3.10. Gantry turning system & components

27.4.1.3.11. Diesel generator system

27.4.1.3.12. Maintenance hoist

27.4.1.3.13. Air compressor system & components

27.4.1.3.14. Lubrication system

27.4.1.4. Electrical

27.4.1.4.1. Schematics & interlocks

27.4.1.4.2. Single line diagrams

27.4.1.4.3. Control system, components, & screens

27.4.1.4.4. Wiring & conduit

27.4.1.4.5. Limit switches

27.4.1.4.6. Energy chain

27.4.1.4.7. Gantry steering, turning, and auto-steering

27.4.1.4.8. Spreader components & schematics

27.4.1.4.9. Anti-collision system & components

27.4.1.4.10. Anemometer & wind detection system

27.4.1.4.11. Illumination

27.4.1.4.12. Load monitoring system & components

27.4.1.4.13. Communication system

27.4.1.4.14. Electrical house layout & equipment

27.4.1.4.15. Diesel generator equipment & components

27.4.1.4.16. Operator's cabin arrangement, layout, consoles, & components

27.5. Manufacturer's Data Sheets

27.5.1. Manufacturer data sheets shall be provided for all major components and components purchased from suppliers.

27.5.2. Manufacturer data sheets shall provide all required information to fully describe the design, function, and arrangement of the component and include such information as:

27.5.2.1. Manufacturer name

27.5.2.2. Manufacture location

27.5.2.3. Model number

27.5.2.4. Type

27.5.2.5. Capacity

27.5.2.6. Description

27.5.2.7. Power supply

27.5.2.8. Mounting details

27.5.2.9. Operating range

27.5.2.10. Safety features

27.5.2.11. And all other parameters specific to the component

27.6. Application Approval Letters

27.6.1. Where proprietary designs prohibit submission of major component supplier design calculations, the Contractor shall obtain an application approval letter from the supplier.

27.6.2. The letter shall be written on the supplier's letterhead in both the manufacturer's native language and in English, and signed by a representative of the supplier's design group.

27.6.3. The letter details must contain the minimum following requirements:

27.6.3.1. Reference to this specific project

27.6.3.2. Component description, model number, type, etc.

27.6.3.3. Confirmation that the components have been selected for this project based on the specific design requirements of these Specification.

27.6.3.4. Design safety factor and actual calculated safety factor.

27.6.3.5. Supplier's guarantee that the component is recommended for use in the application where it is to be installed.

27.6.3.6. Confirmation of warranty of the component for the application where it is to be installed.

27.6.4. Proprietary design calculations are limited to standard product proprietary details. The Board and Engineer respect the privacy of Contractor designs and assure the Contractor that any/all submitted calculations will not be distributed outside of personnel directly responsible for the review of the design calculations.

27.7. Manufacturing, Testing, & Shipping

27.7.1. Inspection & Testing Plan (ITP)

27.7.2. Welding Procedures and Qualified Weld Details

27.7.3. Fabrication, assembly, & erection procedures and drawings

27.7.4. Performance testing procedures

27.7.5. Commissioning testing procedures

27.7.6. Sea voyage calculation (not required for subassembly transportation)

27.7.7. Shipping drawings & methods

27.7.8. Sea fastening calculations (not required for subassembly transportation)

27.7.8.1. Offload procedures, calculations, & drawing

27.8. Manuals & Lists

27.8.1. Operation's manuals

27.8.2. Maintenance manuals

27.8.3. Structural inspection manual

27.8.4. Spare part's list

27.9. Submittal Schedule

27.9.1. Within thirty (30) days after Notice to Proceed, the Contractor shall provide the required document structure, full list of anticipated submittal documents, and anticipated date (schedule) for each submittal.

27.9.2. Within thirty (30) days after Notice to Proceed, the Contractor shall submit the Crane general arrangement and yard interface drawings, including anticipated:

27.9.2.1. Corner loads

27.9.2.2. Tire Loads

27.9.2.3. Tie down forces

27.9.2.4. Other loads imposed on the yard by the Crane.

27.9.3. No less than ninety (90) days prior to the scheduled shipment date, the Contractor shall submit the final plans for shipping, offload, erection, testing, and commissioning. These plans shall include:

27.9.3.1. Drawings

27.9.3.1.1. Shipping arrangement

27.9.3.1.2. Sequence of offload & erection

27.9.3.2. Calculations

27.9.3.2.1. Calculations of all loads imposed on the yard throughout offload and erection, including:

27.9.3.2.1.1. Crane weights

27.9.3.2.1.2. Mobile equipment loads

27.9.3.3. Schedules

27.9.3.3.1. Shipping

27.9.3.3.2. Offload

27.9.3.3.3. Erection

27.9.3.3.4. Testing

27.9.3.3.5. Commissioning

27.9.3.3.6. Training

27.9.4. Within thirty (30) days after Notice to Proceed, the Contractor shall begin making regular design submittals according to these Specifications. The Contractor shall provide sufficient time for review and revision of the submittals according to the submittal process such that documents (drawings & related calculations, supplier data) can reasonably be anticipated to be to the satisfaction of the engineer at least thirty (30) days before the drawings will be issued to production for each component of the Crane.

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28. Training

28.1. General

28.1.1. During commissioning of the Crane at the Board's facility and prior to Substantial Completion, the Contractor shall provide training for the Board's operations and maintenance personnel.

28.1.2. The training program shall include:

28.1.2.1. Operations - Forty (40) hours

28.1.2.2. Maintenance – Forty (40) hours; mechanical and electrical

28.1.2.3. Control System– Sixty (60) hours performed by control system supplier

28.1.3. The training schedule will need to be coordinated based on the availability of personnel. Required training times may not be during standard work day hours.

28.1.4. All training shall be performed by an instructor with excellent communication skills in English.

28.1.5. The training program shall provide hands on training as well as classroom training and shall cover all aspects of the Crane operation and maintenance including the use of special tools, equipment, or software.

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29. Spare Parts

29.1. General

29.1.1. Spare parts are critical to the performance and reliability of the Crane. The required spare parts are dependent on the Contractor's design; therefore, the Contractor is responsible for developing the list of required spare parts, including those that are to be provided prior to Substantial Completion of the Crane.

29.2. Spare Parts List

29.2.1. The Contractor shall provide a complete parts list for all components on the Crane.

29.2.2. Parts shall be identifiable and cross referenced with drawings, schematics, crane systems, etc. to ensure parts are simple and easy to find in the list.

29.2.3. The list shall be provided in electronic Microsoft Excel spreadsheet containing the necessary functionality for:

29.2.3.1. Searching, sorting, and filtering by term, part number, manufacturer, crane system, etc.

29.2.3.2. Adding and storing notes

29.2.3.3. Details of this requirement to be worked out based on the Contractor's standard spare parts electronic format.

29.2.4. The spare parts list shall include the following information for each part:

29.2.4.1. Contractor part number

29.2.4.2. Contractor drawing number where part is identified

29.2.4.3. Contractor piece mark on the drawing

29.2.4.4. Contractor's P.O. number for original purchase

29.2.4.5. Part name

29.2.4.6. Full part description

29.2.4.7. Location on the Crane (system)

29.2.4.8. OEM name

29.2.4.9. OEM/distributor phone number local to the Board's facility

29.2.4.10. OEM website

29.2.4.11. OEM part number

29.2.4.12. Estimated delivery lead time

29.2.4.13. Quantity used per Crane

29.2.4.14. Recommended spare quantity

29.2.4.15. Expected life/replacement interval

29.2.4.16. Link to other locations used on the Crane.

29.3. Initial Spare Parts

29.3.1. The Contractor shall provide initial spare parts to be delivered with the Crane in sufficient quantity to provide two (2) years of inventory for Crane operation based on the quantity of Cranes delivered under this Contract.

29.3.2. As a minimum, one (1) of each mechanical, electrical, control, and spreader components which are likely to wear or may be subject to damage or failure (even premature failure) shall be provided.

29.3.3. The Contractor shall provide his recommended initial spare parts, but must also include the minimum parts below:

29.3.3.1. Crane Mechanical Systems

Component	Quantity
Sheaves	Four (4) sheave assemblies of each type/size, complete with bearings, seals, shaft, etc.
O-rings	25% of (but no less than ten (10)) of each type and size of O-Rings on the Crane.
Brake pads	One (1) set of brake pads for each brake (total brakes not each type/size) on one (1) Crane.
Brake disc	One (1) brake disc for each brake size/type.
Brake thruster	One (1) of each size/type of brake thruster.
Complete Brake Unit	One (1) complete brake of each size/type.
Wire rope slap blocks/ rollers	Spare part quantity equal to the quantity installed on all Crane(s).
Trolley wheels	One (1) complete trolley wheel assembly w/bearings, seals, shaft, etc.
Trolley wheels	Four (4) wheels, bearings, and seals
Tire assembly	One (1) complete tire assembly with bearings and seals
Tire(s)	Two (2) spare tires
Bearings & seals	Spare part quantity equal to the quantity installed on all Crane(s).
Bearing & seals (support rollers)	Four (4) sets of bearings and seals for each type/size/configuration
Cylinders and actuators	Two (2) of each type/size cylinder and actuator (including screw jacks) complete with encoders when applicable.
Cylinder position assembly	One (1) set of each type/size
Headblock pin connection replaceable bushings	One (1) complete set for one (1) headblock
Wire rope	Two (2) complete sets of ropes for all Crane(s)
Steel reels for wire rope	Two (2) for each type/size/length wire rope

29.3.3.2. Crane Electrical Systems

Component	Quantity
Cable reel slip ring assembly	One (1) assembly
Cable reel fiber optic rotary joint	One (1) assembly
Motor starters	One (1) of each type/size
Breakers	One (1) of each type/size
Control fuses	Spare part quantity equal to five times (500%) the quantity installed on one (1) Crane.
MV gantry cable	One (1) cable of the required length, complete with supply of cable termination goods.
Spreader cable	One (1) cable of the required length complete with plugs on both ends, pre-wired, and tested

Ribbon cables	One (1) set of each type/size.
Cable chain	One (1) assembly
Motors	One (1) of each size/type motor (main functions and auxiliary AC motors)
Space heaters	One (1) of each type/size
Limit switch	Two (2) complete assemblies of each type complete with head & arm where used.
Limit switch head & arms	Two (2) of each type
Proximity switch	Four (4) complete assemblies of each type.
CMS components	Two (2) of each PLC, CPU complete with all required components
Drives	Two (2) of each drive type pre-programmed and interchangeable with its respective crane drive
Power semi-conductor device	Two (2) sets of each type including IGBT, power rectifiers, and diodes (excluding diodes mounted on printed circuit boards)
PLC card / interface device	Two (2) of each type
Power conversion unit	One (1) set each type including the front rectification unit
I/O cards	Two (2) of each size/type
Electronic printed circuit board	Two (2) of each type including the PC boards used in the controller system, drive control system, crane overload system, diesel genset and crane diagnostic system, and intercom system
Consumable protective devices	Two (2) times the quantity used on one crane (200%) including the transformer, disconnect fuses, lightning protection system components, motor protection fuses, semi-conductor fuses, etc.
Power transformers	One (1) of each type excluding the main power transformer
Control relays	One (1) of each type
Operator device contact blocks	25% of the total quantity used on one (1) crane
Resistors	Two (2) of each type used for brake chopping and/or current limiting on the cranes including drive control system and diesel genset.
Router, modem & switches	One (1) of each type
Power supply	One (1) of each type
CCTV camera	Two (2) of each type with accessories
CCTV camera controller	One (1) of each type
Scanner/position sensors	Two (2) of each size/type
Load cells	One (1) complete set of load cells used on one (1) crane.
Tachometers & encoders	Two (2) of each size/type
Master switches	Two (2) of each size/type including sending unit
Anemometer	One (1) of each type
Lights (floods, walkways, e-house, etc.)	Four (4) of each type/size light used on the Crane.
Pushbuttons, indicating lights, and selector switches	Six (6) of each type

29.3.3.3. Spreader Specific (in addition to those items stated above)

Component	Quantity
Cylinders and mechanical or hydraulic actuators	Two (2) of each type/size
Hydraulic valve control circuit cards	Two (2) of each type/size
Rod seal kits	Two (2) of each type/size
Hydraulic valves	One (1) of each type/size
Solenoids	Four (4) time the total quantity used on one spreader
Hydraulic filter elements	Two (2) times the total quantity used on one spreader
Filters	Two (2) times the total quantity used on one spreader
Hydraulic pumps	One (1) of each type/size
Spreader twistlocks	Eight (8) twistlocks for each spreader provided.
Spreader corner plungers	Eight (8) plunger assemblies for each spreader provided.
Spreader flippers	One (1) complete set for each spreader provided.
Spreader actuators	Two (2) of each type/size
Spreader node	Two (2) complete nodes for spreader end and Crane end
Bromma SC3 Ethernet cable	One (1) cable
Bromma twin landing kit	Two (2) kits
Bromma hydraulic pressure gauge (250 Bar)	One (1) gauge with hose

29.3.4. The Contractor shall also provide a list of spare parts provided, in both Excel and PDF formats.

29.4. Spare Parts Containers (Option)

29.4.1. Two (2)insulated HVAC climate controlled spare parts containers made from new and unused ISO 40' shipping container shall be provided and each container shall be outfitted with the following:

29.4.1.1. One (1) 208VAC 3Ph 60Hz, 100A distribution panel.

29.4.1.2. One (1) 120VAC 1Ph 60Hz duplex receptacle installed every 1.8m (6 ft) along the interior wall at an elevation of 0.9m above the floor. Receptacles shall be NEMA 5-20R rated and GFCI protected.

29.4.1.3. One (1) 120VAC 1Ph 60Hz exterior duplex receptacle installed every 1.8m (6 ft) along the exterior walls of the container at an elevation of 0.9m above the floor. Receptacles shall be NEMA 5-20R rated and GFCI protected and have an "in use" cover. The exterior duplex receptacles are only required on one (1) of the containers.

29.4.1.4. Ten (10) 120VAC LED lamp fixtures (in accordance with 8.32) evenly spaced along the interior of the container to achieve a minimum 400 lux illumination inside the container.

29.4.1.5. One (1) 36" steel exterior man door located on one wall of the container near the end double doors. The Contractor shall confirm which side of the container shall be outfitted with the door with the Engineer.

29.4.1.6. 18" deep storage shelving running the full length of the container on one side with six (6) shelves spaced from floor to ceiling to accommodate the size of the spare parts.

29.4.1.7. 24" deep storage shelving running the full length of the container on one side with six (6) shelves spaced from floor to ceiling to accommodate the size of the spare parts.

29.4.1.8. The lower container shelving shall be supported by the walls and ceiling with a 1.06m (42") clear zone from the floor to the bottom shelf. There shall be no vertical members touching the floor.

29.4.1.9. Labeled plastic storage pins for organizing spare parts including 700 bins size 6" (Quantum Storage Systems modelQSB207YL) and 800 bins size 4" (Quantum Storage Systems modelQSB201YL) labeled with Dymo model 18445 tape.

29.4.2. All bins and shelves shall be labeled consistent with the spare parts list and drawing cross reference list.

29.4.3. Electrical supply to the container will be performed by others.

29.4.4. Access to the upper container shall be by 36" wide access stairs.

29.4.5. The container shall include a weatherproof inventory list and schematic of the arrangement of the container and shall have a dedicated storage compartment near the hinged door.

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30. Major Component Suppliers

30.1. General

30.1.1. The Cranes shall be designed and delivered with components provided from the major component suppliers in 30.2.

30.1.2. Alternative suppliers may be considered by the Board, provided that the supplier and the product offered, as a minimum, meet the following criteria:

30.1.2.1. The product is determined, in the opinion of the Board and the Engineer, to be equal to or better suited than the components from the major component suppliers in 30.2.

30.1.2.2. The supplier of the proposed alternative has sales, service, and support local to the Board's facility, and representatives of the supplier arrange a meeting with the Board and Engineer to demonstrate and describe their local presence in the Board's facility area.

30.1.2.3. The supplier of the proposed alternative provides a reference list of five or more references of Crane applications with contact information for terminal personnel who can speak freely on the product performance, reliability, and supplier service.

30.1.2.4. The Contractor can provide justification for deviating from the major component suppliers in 30.2.

30.1.3. Evaluation and acceptance of the proposed alternative supplier is at the sole discretion of the Board and the Engineer. Concerns over availability, price, delivery, etc. are the responsibility of the Contractor to resolve prior to award of the Contract. Once the Contract is signed, these factors are irrelevant to discussions of proposed alternative suppliers.

30.2. Suppliers List

Description	**Supplier(s)**
Gearing	Falk Flender Sumitomo SEW
Brakes	Pintsch-Bubenzer
High speed main drive couplings	Pintsch-Bubenzer
Couplings	Pintsch-Bubenzer Falk Flender Brook-Hanson
Drum Couplings	Malmedie
Bearings	SKF Timken FAG NTN INA
Buffers & Bumpers	OLEO
Wire Rope	MacWhyte Bridon Casar

Wheels	Xtek
Trolley Rail System	Gantrex USA
Sheaves	Xtek
Tires	Contractor standard to be reviewed
Spreader	Bromma
Maintenance Diesel Genset	Cummins Caterpillar
Control system, drives, PLC, CMS	ABB, TMIEC, Siemens
Transformers	Control system supplier
Main function motors	Control system supplier
MV Cable Reel	Cavotec Conductix-Wampfler
MV Cable, Spreader Cable	Pirelli
Energy Chain	IGUS Condutix-Wampfler
Limit switches	Turk Telemecanique Sick
Operator's Cabin	Brieda Merford
Paint	Carboline International BLP Mobile
Illumination	Phoenix
Communication	Gaitronics
CCTV	Orlaco
Load Monitoring	PAT Tecsis
Air Compressor	Ingersoll-Rand
Crane Anit-Collision System	SICK

31. Terms, Definitions, & Units

31.1. General

31.1.1. The terms, definitions, and units used in these Specifications are consistent with terminology used in the United States of America for container handling equipment.

31.1.2. When a term, definition, or unit is not clear to the Contractor, a clarification shall be requested from the Engineer. A misunderstanding or misinterpretation of terms or definitions does not relieve the Contractor from meeting the requirements of these Specifications.

31.2. List of Terms & Definitions

31.2.1. As a reference for the Contractor, the following terms, symbols, definitions, and units are provided as clarification for the interpretation of these Specifications.

Term	Description
Fabrication Site	Refers to the Contractor's main facility where the manufacture, assembly, erection, and testing will be performed prior to shipping the Crane to the Erection Site.
Erection Site	Refers to the location of the Crane within the Mississippi River Intermodal Terminal where all Crane Work will be performed by the Contractor, including the RTG Erection Area and RTG Testing Area, terminal entrance & access, electrical and utility hookups, etc.
Erection Area	Refers to the area provided by the Terminal Yard Contractor to the Crane Contractor for final assembly, erection, testing, and commissioning of the Crane at the Erection Site. The RTG Erection Area and RTG Testing Area will be available to the Contractor from November 1, 2015 – January 4, 2016.
The Engineer	Refers to the Board's Engineering representative or representatives identified as a primary contact for the Work. The Engineer may refer to one of the Board's personnel, an outside consultant, or other personnel as identified by the Board. Terms synonymous with "the Engineer" include: Owner's Engineer
Board	The Board of Commissioners of the Port of New Orleans Often referred to as "Owner" by other terminals and Port Authority
Days, Weeks, Months	All references to time and duration are calendar days, weeks, months, etc. not working days, weeks, or months.
Inspection	An organized examination of the Work required to ensure quality control of the Work
Subcontractor	Any person, company or firm hired by the Contractor to perform custom design, manufacturing, or other services at the direction of the Contractor. Typically, a Subcontractor is a secondary contractor who performs a portion of the Work required to be performed by the Contractor.

Vendor	See Component Supplier.
Component Supplier	Refers to a company who enters into an agreement with the Contractor to provide a product, component, device, material, etc. marketed, designed, and sold by the company. Any contractor that delivers a product, component, device, etc. to the Contractor's design is not a Component Supplier.
Terminal	Refers to the Mississippi River Intermodal Terminal located at the Port of New Orleans Napoleon Avenue Terminal Complex in New Orleans, Louisiana, USA. The RTG Erection Area is located within the Erection Site located at the Mississippi River Intermodal Terminal.
Terminal Yard Contractor	Refers to the general construction company awarded a Contract by the Board to develop the Mississippi River Intermodal Terminal which will be under construction throughout the Crane manufacturing, testing, and commissioning process.

31.3. Units

31.3.1. Units used in these Specifications primarily follow the standard units of the International System of Units (SI), also known as metric units. In some cases Imperial also known as US or English units are used for convenience and clarity of conversion between units.

31.3.2. The most commonly used units in these Specifications, their symbol, and conversion factor to other units are as follows:

Measurement	Unit	Symbol	Description/comment
Length	Meter	m	
Length	Millimeter	mm	
Mass	Metric Ton	t	1,000 kg ; 2205 lb
Mass	Kilogram	kg	1/1000 t ; 2.204 lb
Mass	Pounds	lb	1/2.204 kg ; 1/1000 k
Mass	Kips	k	1000 lb
Mass	Long Ton	LT	2240 lb ; 1016 kg
Mass	Short Ton	s.t.	2000 lb
Force	Newton	N	9.81 x 1 kg
Pressure	Newton/Sq. millimeter	N/mm^2	
Pressure	Kilograms/cm^2	kg/cm^2	
Pressure	Bar	bar	
Speed	Meters/Second	m/s	
Speed	Meters/Minute	m/min	
Speed	Kilometers/Hour	km/hr	
Speed	Miles/Hour	mph	
Speed	Feet/Minute	Fpm	
Hardness	Brinell Hardness	BHN or HB	
Power	Kilowatt	Kw	
Power	Horsepower	hp	
Voltage	Volts	V	
Amperage	Amps	A	
Torque	Newton-meter	Nm	
Torque	Foot-pound	ft-lb	

Volume	Liter	L	
Volumetric Flow	Cubic Meters/Minute	m^3/min	
Volumetric Flow	Cubic Feet/Minute	cfm	

31.3.3. The above list of common units is not inclusive of all units used in these Specifications. If the Contractor is unclear on any units used in these Specifications, a clarification shall be requested from the Engineer.

PORT NOLA
THE PORT OF NEW ORLEANS

December 18, 2014

Konecranes Finland Corporation
1140 Bloomfield Avenue
West Caldwell, New Jersey 07006

Attn: Mr. Richard A Russell, Sales Director, Port Cranes North America

RE: MISSISSIPPI RIVER INTERMODAL TERMINAL IMPROVEMENTS
ELECTRIC RUBBER TIRE GANTRY CRANE PROCUREMENT
REQ. NO. 071952 W.O. 1-109
NOTICE OF AWARD

Dear Mr. Russell:

I am pleased to advise you that the Board of Commissioners of the Port of New Orleans has awarded this contract in the amount of $4,850,000.00 to Konecranes Finland Corporation, at the regularly scheduled Board Meeting held on December 18, 2014.

You are requested to advise this Board promptly of the number of complete sets of plans and specifications you will need, over and above those which you received during the bidding period.

Please be advised that this contract will be administered by our Construction Services group of the Port Development Division. All verbal requests for services and materials should be made to the writer. The Construction Section's phone number is (504)528-3293. Please indicate our project description, requisition number and the work order number on all correspondence.

Sincerely,

William J. Meliet
Manager Construction Services

WJM/bgh

cc: Mr. Jonathan McDowell, P.E.
AECOM Technical Services, Inc.
1555 Poydras Street, Suite 1860
New Orleans, LA 70112

Ms. Carol Balthazar
Riverworks
201 St. Charles Ave, Suite 2570
New Orleans, Louisiana 70170

Cc: Mr. Brad P. Navarre, P.E.
Boos Navarre, LLC
P. O. Box 1018
Daphne, Alabama 36526

CONTRACT FOR MATERIAL AND LABOR

FOR THE

MISSISSIPPI RIVER INTERMODAL TERMINAL IMPROVEMENTS
ELECTRIC RUBBER TIRE GANTY CRANE PROCUREMENT

This Agreement, (hereby after the Agreement or Contract),made and entered into in multiple counterparts, effective on the date last executed by a party hereto, by and between:

BOARD OF COMMISSIONERS OF THE
PORT OF NEW ORLEANS

and

KONECRANES FINLAND CORPORATION

WITNESSES:

That, for and in consideration of payments hereinafter stipulated to be made to Contractor by Board, Contractor and Surety (hereinafter appearing) hereby agree and bind themselves jointly, severally and in solido at their own cost to furnish all labor and materials, equipment, transportation and other facilities, necessary and requisite to perform, construct, complete and deliver in a substantial and workmanlike manner, to the entire satisfaction of the Board representative, hereinafter called "Engineer," all of the work called for, embraced and described in the Plans and Specifications of Board, and according to the Bid of Contractor, for the construction of

MISSISSIPPI RIVER INTERMODAL TERMINAL IMPROVEMENTS
ELECTRIC RUBBER TIRE GANTY CRANE PROCUREMENT (hereby after E-RTG Crane(s) or Cranes(s))

in the manner and in strict accordance with said Plans and Specifications and Bid, as accepted by Board and in accordance with the Notice of Award as follows, to wit:

Req. No. 071952

(a) The Notice of Award dated the 18th day of December, 2014, a copy of which is annexed hereto and made part of this agreement as fully as if herein at length.

(b) The specifications dated the 22nd day of October 2014, are hereto annexed and made a part of this agreement as fully as if written herein at length and are marked for identification "Specifications for MISSISSIPPI RIVER INTERMODAL TERMINAL IMPROVEMENTS ELECTRIC RUBBER TIRE GANTY CRANE PROCUREMENT"

(c) The Plans issued with said Specifications are hereto annexed and made part of this agreement and are initialed by the parties hereto for identification.

(d) The Cost Proposal of Contractor dated the 1st day of December, 2014 is hereto annexed and made a part of this agreement and Addendum No. 1 dated November 19, 2014 and Addendum No. 2 dated November 21, 2014, is hereto annexed and made a part of this agreement.

Contractor hereby agrees to commence work under this agreement on the date or dates as set forth in the aforesaid Notice of Award, and to complete all work under this agreement on or before the dates as therein set forth, subject to the assessment of ascertained and liquidated damages as set forth in the Bid of Contractor. Contractor agrees that ascertained and liquidated damages shall automatically apply against Contractor without the necessity or formality of putting Contractor in default therefore, and Contractor, further agrees that Board shall have the right to retain from any monies due Contractor, or which may become due, an amount sufficient to pay such ascertained and liquidated damages.

That for and in consideration of the faithful performance by Contractor of all singular the obligations herein assumed by, or imposed upon, Contractor by this agreement, Board shall make payment to contractor, in the manner and at the time or times set forth in the Specifications and in accordance with Contractor's Bid, but nothing herein shall prevent Board, if it sees fit, from making payments to Contractor, without the consent of surety, in amounts or at different times than fixed herein.

INVITATION TO BID

MISSISSIPPI RIVER INTERMODAL TERMINAL IMPROVEMENTS
ELECTRIC RUBBER TIRE GANTRY CRANE PROCUREMENT

Board of Commissioners of the Port of New Orleans will receive sealed bids in the Purchasing Department, 2nd floor, room 240, 1350 Port of New Orleans Place, New Orleans, Louisiana 70130 on December 02, 2014 until 2:00 P.M., local time, for Requisition No. 071952.

The work consists of furnishing all labor, material and equipment for the manufacturing, delivery, assembly, testing and training for two electric rubber tire gantry cranes as per the Drawings and Specifications provided in this bid document. The site for delivery is located on Mississippi River Intermodal Yard at the Napoleon Avenue Terminal Complex near 4100 Terminal Drive, New Orleans, LA 70115 at Mississippi River Mile 99.0 Ahead of Passes. (Estimated Cost: $3.0 to $4.0 million).

All Bids must be in accordance with the Contract Documents on file with the Port of New Orleans.

Complete Contract Documents may be obtained at Contract Administration on the 2nd floor, Room 203, at the above address on a payment of a non-refundable fee of $40 per set by check or money order only to the Board of Commissioners of the Port of New Orleans. In accordance with LSA R.S. 38:2212 (A) (1) (e), contract documents may also be accessed at our Port Plan Room, Port of New Orleans Web Site at http://portno.com/active-construction-projects.com.

If request for Contract Documents is made through U.S. mail or other delivery services, bidder must furnish a street mailing address and will be held responsible for service fees.

A pre-bid conference will be held on November 13, 2014 at 10:00 a.m. local time at the auditorium on the 1st floor of 1350 Port of New Orleans Place. A site visit will occur after the conference. Attendees will be bussed to the site. **Bidders are urged to attend. Bidders are requested to RSVP for the pre-bid conference before November 13, 2014 by calling 504-528-3321.** The intermodal yard construction has not commenced; therefore, the site visit would mainly provide the Contractor with the general location within the Port and potential route for transporting the Cranes from the wharf to the yard, if required. TWIC is not required to attend the pre-bid meeting.

Federal regulations require that persons seeking entry to secure areas of United States ports must present a valid Transportation Workers Identification Credential (TWIC) card and must maintain possession of the TWIC at all times in secure port areas.

Persons seeking entry to the below listed facilities of the Port of New Orleans must possess a TWIC in order to attend pre-bid meetings on port property. Restricted areas include port property between Felicity Street and Henry Clay Avenue, Alabo Street Wharf, Jourdan Road Wharf, the Julia Street and Erato Street Cruise Terminals, and during cargo activities at Poland Avenue Wharf and Governor Nicholls Street Wharf. Prospective bidders must provide their own Harbor Police Department (HPD) approved TWIC escorts for those in their party who do not have TWIC's. Note that only

contractors with open Port of New Orleans contracts are eligible to be on the approved escort list. The port will not provide nor arrange for escorts. See Section 1000 – General Requirements.

Once an employer is under contract with the Board, TWIC card holders and their Sponsoring Employer must submit an application to Harbor Police and the TWIC card holder must attend a training session in order to be certified as an Approved TWIC Escort for anyone entering the secured area without a TWIC.

Contractor shall perform at job site, in his own shop or in his own plant or yard, and with his own organization, all design and management supervision of all work to be performed under the Contract.

The Board as an equal opportunity public entity invites and encourages minority-owned and disadvantaged business companies to submit bids on its projects.

Hard copies of the contract documents are available for purchase. Electronic copies of the contract documents are available to prospective bidders via our Port Plan Room on the Port of New Orleans' web site at www.portno.com. Contract documents may also be available via e-mail to prospective bidders.

For general information or for questions related to bidding, please contact:

Mr. Terry Martin, Purchasing Agent
Phone: (504) 528-3345
E-mail: martint@portno.com

Technical questions should be addressed to the following:

Mr. Bryan Burger, P.E., Container Crane Department Manager
Port of New Orleans
Phone: (504) 528-3415
E-mail: burgerb@portno.com

and

Mr. Brad P. Navarre, P.E., Port's Consulting Engineer
Boos Navarre, LLC
Phone: (251) 459-0862
E-mail: bnavarre@boosnavarre.com

These individuals are not authorized to and shall not render legal opinions or advice. No information will be given regarding the proper evidence of corporate authority as required in this bid. Each bidder is advised to consult his own counsel for such information.

Please be advised that these individuals are not the legal representatives of the Board.

BOARD OF COMMISSIONERS OF THE PORT OF NEW ORLEANS

NOTE TO PROSPECTIVE BIDDERS

CONTRACT FOR

MISSISSIPPI RIVER INTERMODAL TERMINAL IMPROVEMENTS

ELECTRIC RUBBER TIRE GANTRY CRANE PROCUREMENT – RE ADVERTISED

REQ. NO. 071952

November 21, 2014

FOR BIDS DUE On December 2, 2014 at 2:00 P.M.

Dear Sirs:

Please note the following:

ADDENDUM NO. 2

SPECIFICATIONS

The following modifications, clarifications and explanations to the technical specifications are provided in response to bidder requests for clarification and information or substitutions per General Conditions Article 11 of the specifications.

Technical Specification Section 7.6.1 shall be replaced in its entirety as follows:

7.6.1. The dynamic coefficient (impact factor) values to be applied per F.E.M. shall be 1.3. For select components, the Engineer shall permit a reduction of the dynamic coefficient to a minimum of 1.15 where the Contractor can demonstrate that the higher dynamic coefficient is impractical based on their design and manufacturing constraints.

Technical Specification Section 11.13 shall be replaced in its entirety as follows:

11.13. Paint Supplier Representation

11.13.3.1. The paint supplier shall be actively involved with this project throughout the entire period of coating activities and shall perform periodic/random onsite inspections to witness/review coating activities identified in this specification.

11.13.3.2. The Contractor shall submit all coating activity inspection reports to the paint supplier representative at regular intervals throughout the project which will allow the paint supplier to verify that the Contractor is performing the required inspections and following the approved specification.

11.13.3.3. The Contractor shall submit the proposed paint supplier involvement procedure during the design review phase.

Very truly yours,

Bryan Burger

Mr. Bryan Burger, P.E.
Project Engineer
Board of Commissioners of
The Port of New Orleans
New Orleans, Louisiana

BOARD OF COMMISSIONERS OF THE PORT OF NEW ORLEANS

NOTE TO PROSPECTIVE BIDDERS

CONTRACT FOR

MISSISSIPPI RIVER INTERMODAL TERMINAL IMPROVEMENTS

ELECTRIC RUBBER TIRE GANTRY CRANE PROCUREMENT – RE ADVERTISED

REQ. NO. 071952

November 19, 2014

FOR BIDS DUE On December 2, 2014 at 2:00 P.M.

Dear Sirs:

Please note the following:

ADDENDUM NO. 1

SPECIFICATIONS

The following modifications, clarifications and explanations to the technical specifications are provided in response to bidder requests for clarification and information or substitutions per General Conditions Article 11 of the specifications. The "Addendum Descriptions" below are not intended to replace the technical specification section referenced in its entirety unless specifically indicated.

Technical Specification Section	Addendum Description
3.6.10	This Section 3.6.10 of the specification is deleted in its entirety.
4.10.12	As clarification, this requirement does not apply to structural fasteners.
5.2	The headblock is preferred to interface with the Board's existing Bromma STS 45 twin-lift spreader and Doosan Cargo Beam. See attached reference documents (Exhibits A, B, C and D) for interface details.
5.2	As clarification, the headblock is only required to interface with the Board's existing lifting attachments if a horizontal pin connection is provided under Alternate No. 1.
5.2.9	The crane shall be able to hoist up to 20% of full rated speed when no other lifting devices are attached to the headblock.
6.12.13	Where the design permits, removable stainless steel drip pans shall be provided to catch grease or oil from the wire rope unless the trolley structure is flat and solid and able to

	catch grease/oil.
6.12.13	As clarification, the intent of this requirement is to minimize environmental contamination. The Contractor is requested to consider environmental protection in their design, where possible.
6.16	The intent of the specification is to minimize lubrication intervals without sacrificing protection of the equipment. If lubrication frequencies more often than 6 month intervals are required to prevent wear, damage, or failure of a system, the Contractor shall provide the recommended lubrication intervals.
6.19.7	All equipment shall be accessible for maintenance with no less than 760mm clearance around equipment, where possible and practical. On a selective basis, clearances less than 760mm may be accepted provided that OSHA compliance is satisfied and the Contractor can demonstrate sufficient equipment maintainability.
8.5.1	A permanently mounted diesel generator shall be provided for maintenance purposes. A removable diesel generator will be considered provided that it can be mounted on or under the sill beam and meets all other requirements for the diesel generator.
8.16.3	The load monitoring equipment with an accuracy of ±1.5% and precision of 0.1 LT shall monitor the load on the hoist ropes. The Contractor's design shall minimize loss of accuracy in a complete system installation.
8.16.9	As clarification, the load monitoring system settings shall be adjustable. It is acceptable for the Contractor to restrict adjustment of the settings without approval.
8.16.14	As clarification, the intent of this requirement is to allow full rated load operation without nuisance overload trips, yet still provide the required overload protection. Greater ranges of accuracy shall be permitted if the Contractor can satisfy this intent.
8.40.3	As clarification, the intention of this requirement is to alert maintenance personnel of the required service to maximize the utilization/longevity of the equipment. A design that meets this intent will be accepted.
8.40.4	As clarification, the full function of the CMS will not be required in the operator's cabin.
10.1.6	The width of access systems shall be maximized based on the Crane structure, but in no case shall the width be less than 760mm, unless approved by the Engineer. On a selective basis, clearances less than 760mm may be accepted provided that OSHA compliance is satisfied and the Contractor can demonstrate sufficient equipment maintainability.
10.4.3	As clarification, if the Contractor can demonstrate maintainability without a platform (i.e. access from ground level), the platform may be omitted.
10.4.4	As clarification, the required use of a manlift is permissible for wiper maintenance, but not for glass cleaning.
11.6.1	In addition to the specified surface finish under this section, "TECTYL 506" or "DINITROL" may be utilized for corrosion protection of non-airtight interior surfaces.
11.7.1	In addition to the specified surface finish under this section, a shop primer coating will also be an acceptable method of corrosion protection for airtight surfaces.
11.8.1	In addition to the specified surface finish under this section, with the exception of floors, the contractor may utilize two coats of flat finish interior alkyd enamel with a total coverage minimum of 70 microns thickness. Additionally, pre-finished corrugated sheet panels may be utilized in operator's cab and electric house locations. Interior floors shall be prepared as specified in section 11.5.
11.13.1	The paint supplier shall have a full time representative on site assigned to this project and must be on site daily to witness/review all coating activities identified in this section. Alternatively, paint supplier may identify one (or more) of the contractor's personnel to fulfill this requirement provided that the paint supplier provides confirmation that this

	person has been verified by the paint supplier to perform representation on behalf of the paint supplier and the paint supplier will not dispute this person's reports/observations.
11.13.2	As clarification, if the above method of utilizing contractor's personnel in 11.13.1 is exercised by the paint supplier and Contractor, the identified person will also be required to satisfy this requirement.
15.4.2	The intent of this requirement is to ensure that the Board's personnel or selected third party inspectors have accommodations equitable to those of the Contractor's inspectors/personnel. Deviations from this requirement will be accepted so long as this intent is satisfied.
19.3.1 & 22.11	As clarification, the intent is to verify the design vs. fabricated crane weight prior to shipment. In the case of site erection, the Contractor shall provide confirmation of subassembly fabricated weights in lieu of the required as-built weighing.
19.4 & 26.2.1	The intent of this requirement is to provide the Board assurance that the crane(s) will not be shipped until readiness for shipping has been verified and the Contractor provides assurance that the work at the Erection Site can be completed in the specified time period. The specific details of the requirements shall be based on the Contractor's accepted manufacturing and shipping plan.
23.3	As clarification, see attached Bromma STS 45 documentation (Exhibit A).
25.3.6	The Contractor shall provide eight (8) bound weatherproof copies of the operating instructions, approximately 150mm x 225 prior to Final Completion. One copy of the manuals in digital media (i.e. CD, DVD or Flash Drive) shall also be provided.
27.3	-The spreader calculations need not be submitted. -The access system calculations need not be submitted, but shall meet all OSHA requirements. -As-built wheel load and stability calculations need not be submitted if verified manufactured weight is within ±3% of design weight. -The wind tunnel requirement shall be removed; however, if wind tunnel data is to be used, the results shall be submitted for review.
29.2.4	The intent is for the Contractor to provide as much information as is reasonably available to the Board so that sourcing replacements, repair, or technical details can be found without extensive research. The requirement for the Contractor to provide the information in the following items is hereby deleted: 29.2.4.4, 29.2.4.6, 29.2.4.9, 29.2.4.10, 29.2.4.15, and 29.2.4.16. As clarification, the Contractor is not required to provide the information in the remaining items for minor parts.
30.2.	The attached supplier list replaces section 30.2 (Exhibit E)

Very truly yours,

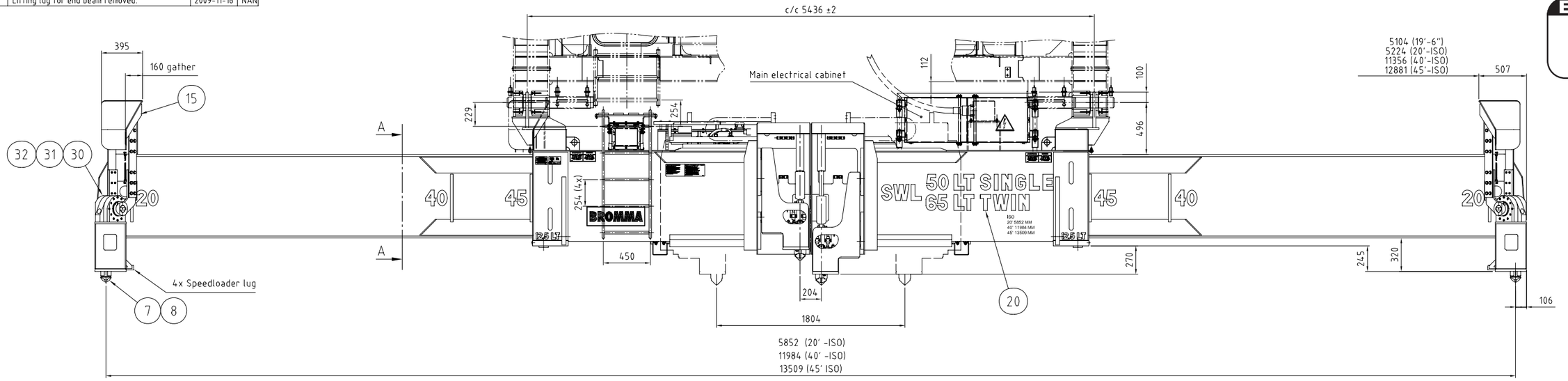
Bryan Burger

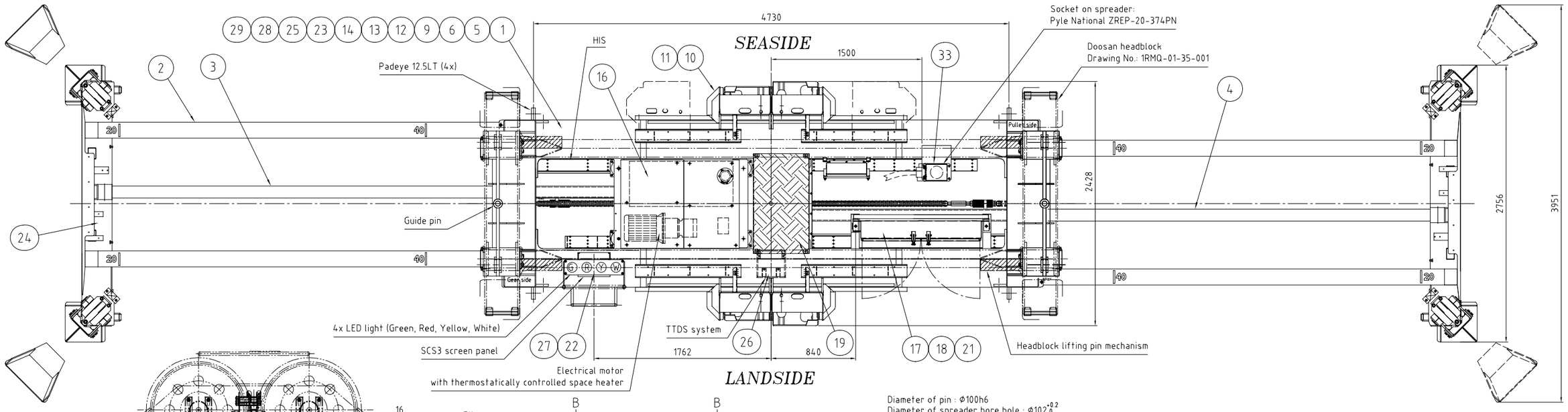
Mr. Bryan Burger, P.E.
Project Engineer
Board of Commissioners of
The Port of New Orleans
New Orleans, Louisiana

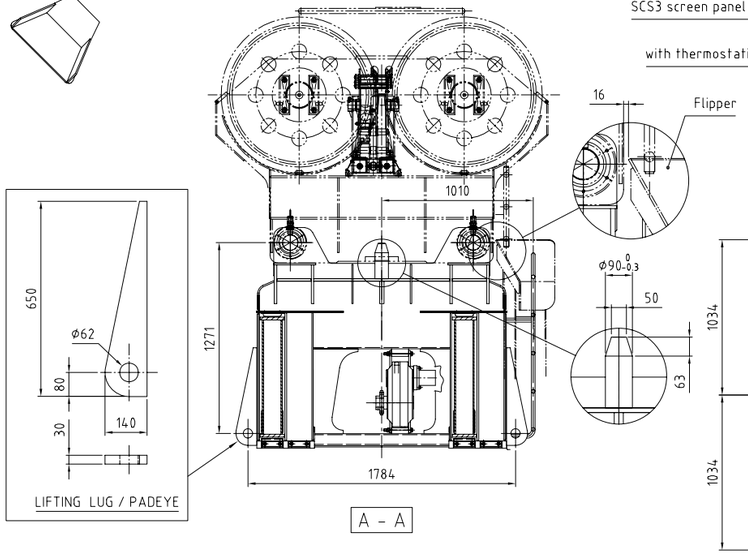
Attachments: Exhibits A, B, C, D and E

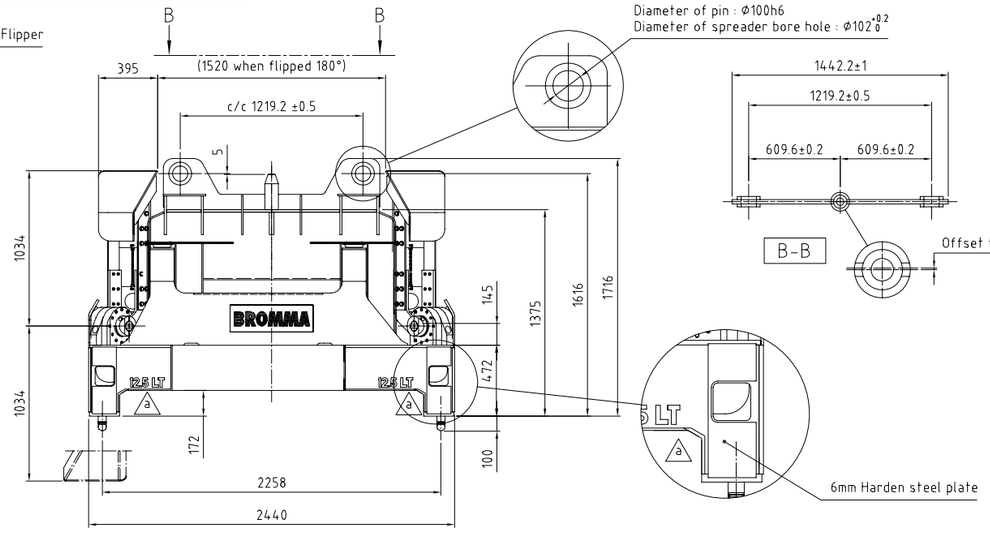
Note	Modified from	Date	Inf.
a	Lifting lug for end beam removed.	2009-11-16	NAN

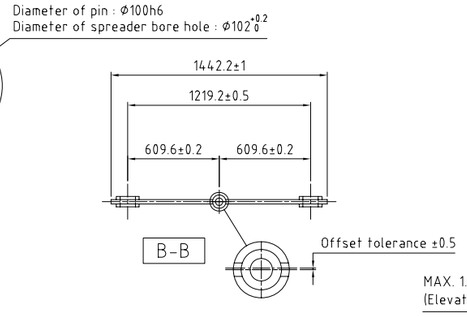
EXHIBIT A

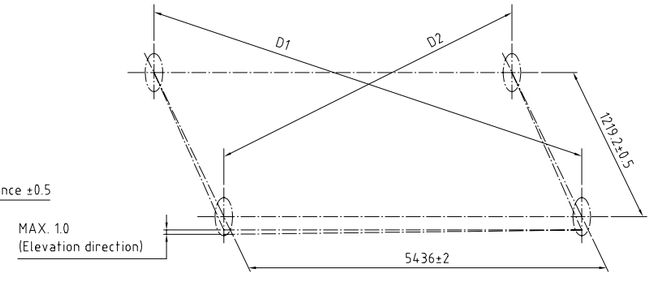












Estimated spreader tare weight : 12.5 Tonne

SIGNED BY	DATE	MATERIAL –	SCALE	WEIGHT	TOLERANCE GENERAL
NAN	2009-08-03	ALT. –	1:20	0,0	SS-ISO 2768-C

BROMMA

GENERAL ASSEMBLY
DOOSAN / P.O.N.O.

FORMAT	STANDARD	REV.
A1	–	a

DRAWING NUMBER 1027381

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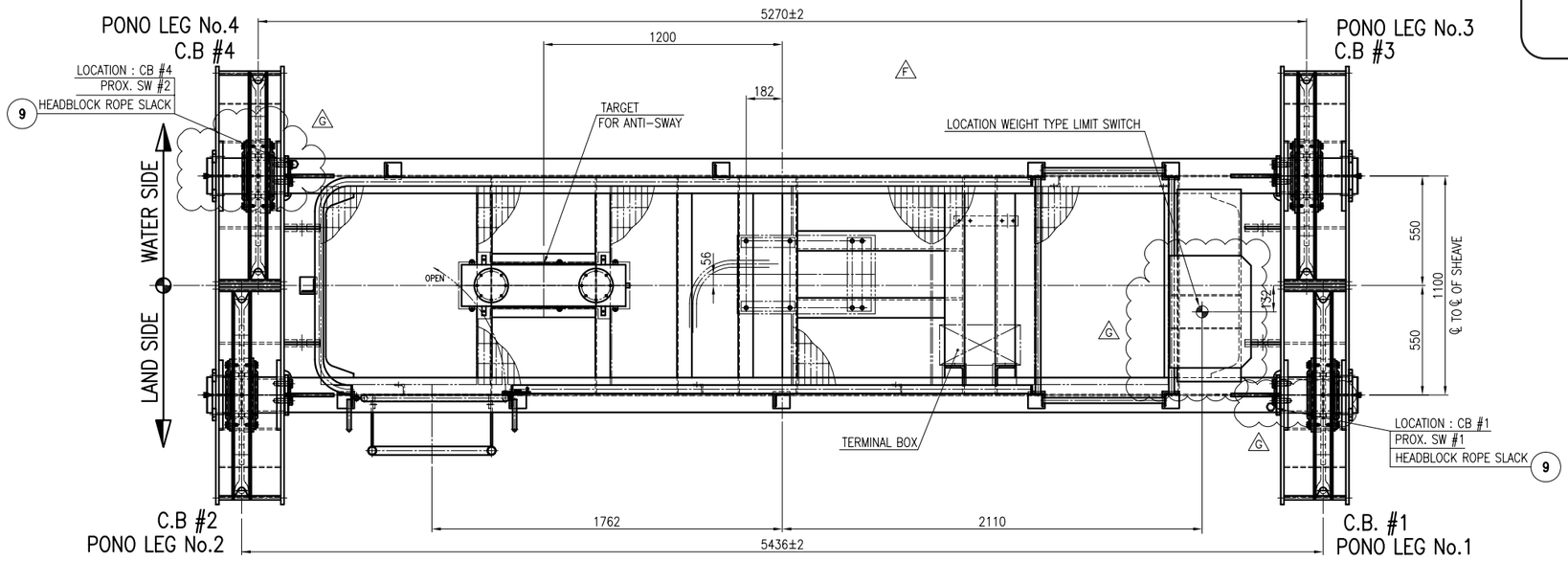
DWG NO. 1RMQ-01-35-100 (모델 번호)

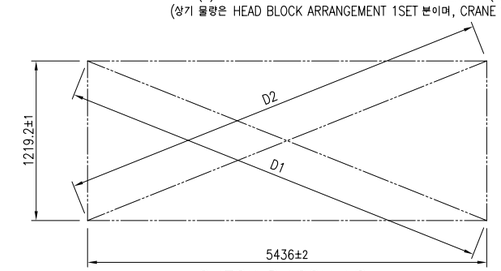
EXHIBIT **B**

품번 NO.	품 명 DESCRIPTION	재 질 MATERIAL	수 량 Q'TY	치수, 도 번 SIZE, DWG.NO.	중량WT.(Kg) UNIT	중량WT.(Kg) TOTAL	비 고 REMARKS
(35)	**HEAD BLOCK ARRANGEMENT**		**1SET**		–	**4572.0**	G
1	HEAD BLOCK STRUCTURE		1	1RMQ-01-35-100	–	2521.8	
2	HEAD BLOCK SHEAVE ASS'Y(A)		2	2RMQ-01-35-200	314.0	628.0	
3	HEAD BLOCK SHEAVE ASS'Y(B)		2	2RMQ-01-35-300	314.0	628.0	
4	HEAD BLOCK HANDRAIL ASS'Y		1	1RMQ-01-35-400	–	381.3	G
5	LOCKING PIN ASS'Y		4	2RMQ-01-35-500	63.1	252.4	
6	CAGE GATE		1	2RMQ-01-35-601	–	10.5	
7	CABLE ANCHOR DEVICE		1	2RMQ-01-35-700	–	150.0	BY ELECT.
8	PROXIMITY SWITCH	PURCH.	8	II0097,IIA2015-ABOA	–	–	SUPPLIED BY ELECT.
9	PROXIMITY SWITCH	PURCH.	2	II0097,IIA2015-BBOA	–	–	SUPPLIED BY ELECT.
10	CABLE CLAMP		1	SEE DETAIL	–	–	

NOTE

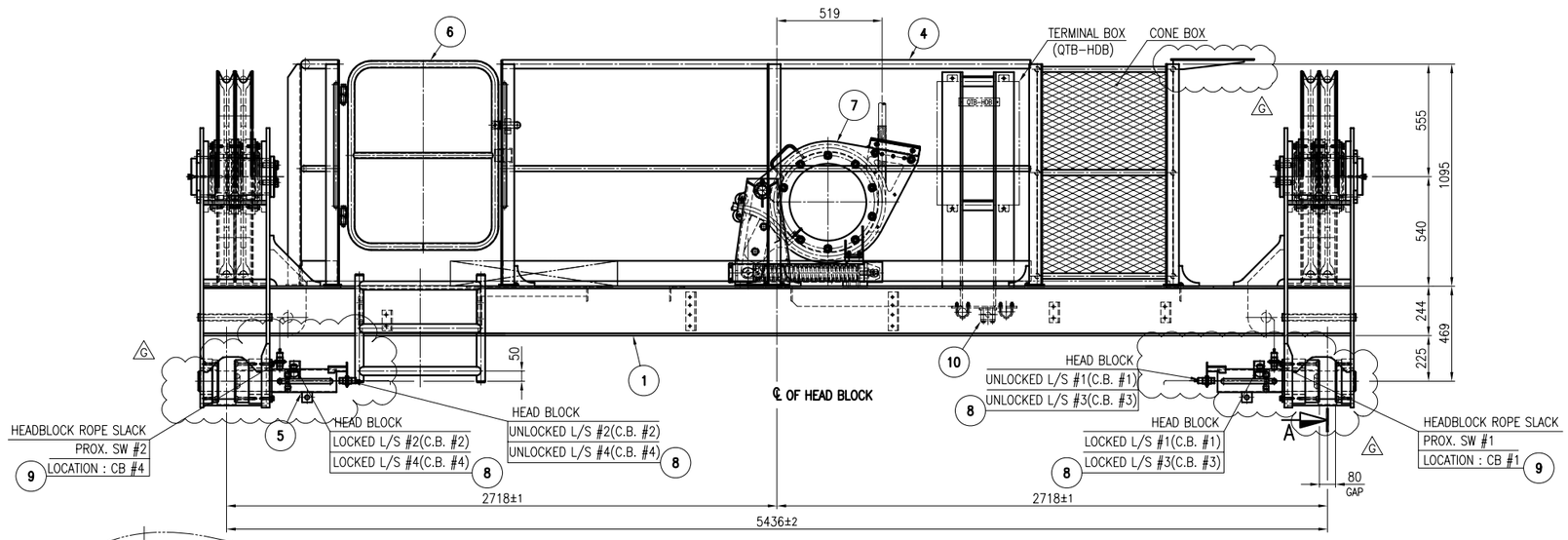
1. MAT'L BILLED FOR ONE(1) SET HEAD BLOCK ARRANGEMENT, ONE(1) SET HEAD BLOCK ARRANGEMENT REQ'D PER ONE(1) CRANE. (상기 물량은 HEAD BLOCK ARRANGEMENT 1SET 분이며, CRANE 1대에 1SET가 필요함.)

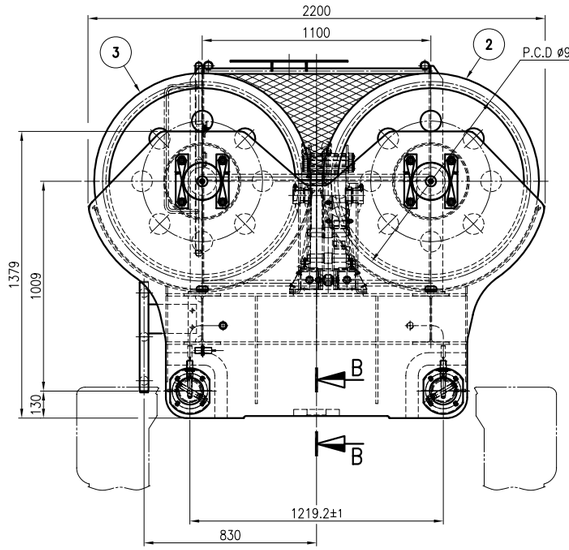


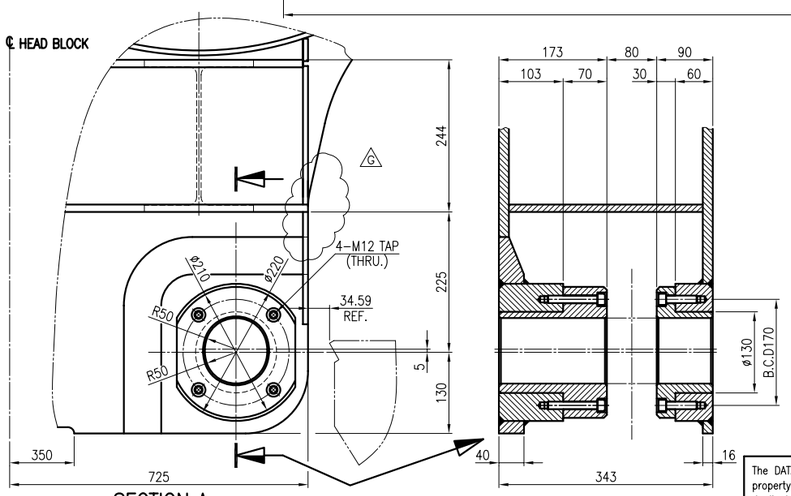


CHECK DIAGONALS

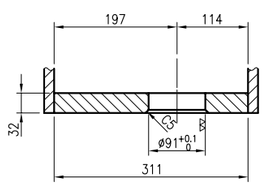
D1 or D2 & D2-D1=6mmMAX.



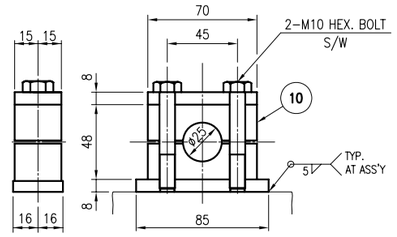




SECTION A



SECTION B-B



HEADBLOCK TO SPREADER SPREADER PIG-TAIL CABLE

	F	CHANGED CLOUD MARK
	F	CHANGED CABLE ANCHOR DEVICE DIRECTION
	E	CHANGED LOCKING PIN DESIGN
	D	REVISED BY GBB COMMENTS
	A	FIRST ISSUE
PONO RMQC		DESCRIPTION OF REVISION(개정 사유)
APPLICATION		CAD FILE NAME(파일명) : 1RMQ-01-35-001-G

G	D.J. LIM	2012.06.05	H.K. CHEE	2012.06.05	N.S. PARK	2012.06.05
F	S.Y. LEE	2011.02.09	H.K. CHEE	2011.02.09	D. W. SEO	2011.02.09
E	S.Y. LEE	2009.09.14	H.K. CHEE	2009.09.14	D.W. SEO	2009.09.14
A	S.Y. LEE	2009.09.04	H.K. CHEE	2009.09.04	D.W. SEO	2009.09.04
REV (개정)	NAME (성명)	DATE (일자)	NAME (성명)	DATE (일자)	NAME (성명)	DATE (일자)
	PREPARED BY(제도)		REVIEWED BY(검도)		APPROVED BY(승인)	

PROJECT (공사명) BOARD OF COMMISSIONERS
PORT OF NEW ORLEANS
2 Rail Mounted Quayside Cranes
REQ. 050791 W.O. 1-889

두산중공업주식회사
Doosan Heavy Industries & Construction Co., Ltd.

도면 정보 보안 주의사항

본 도면 및 이에 포함된 모든내용은 두산중공업(주)의 재산이며 영업 비밀이므로 두산중공업(주) 정보자산 관리책임자의 사전허락 없이 전체 혹은 그 일부를 해당 계약수행을 위한 목적형위 외에 다른 목적으로 사용 및 무단복제 할 수 없으며, 목적형위 완료시 반드시 두산중공업(주)에 반납하여야 하고, 또한 본 도면 이용자는 제 3자에게 그 내용에 대한 기밀유지의 책임과 함께 이에 대한 제반사항 위반으로 인하여 두산중공업(주)에 손해를 입혔을 시 '영업 비밀 보호법'에 따른 책임을 져야 합니다.

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PROJ (투상법)	3각법
UNIT (단위)	mm
SCALE (축척)	1/15
ITEM NO.(품목번호)	

TITLE (도명) HEAD BLOCK ARRANGEMENT

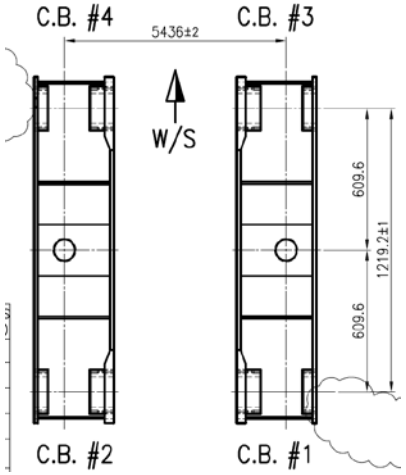
DWG NO (도면 번호) 1RMQ-01-35-001 | REV (개정) G | SHEET (매수) 1/1

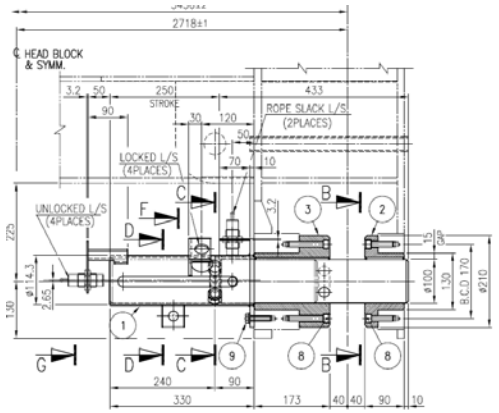
CONT. NO. (도면관리 번호)

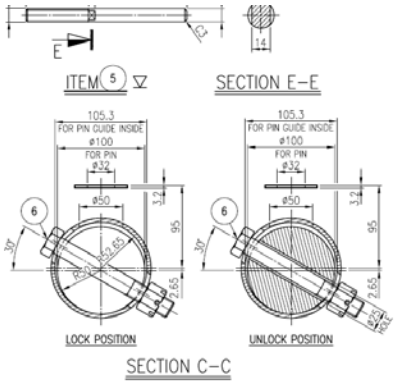
(설계/기술-3400-002) A1 (594x841mm)

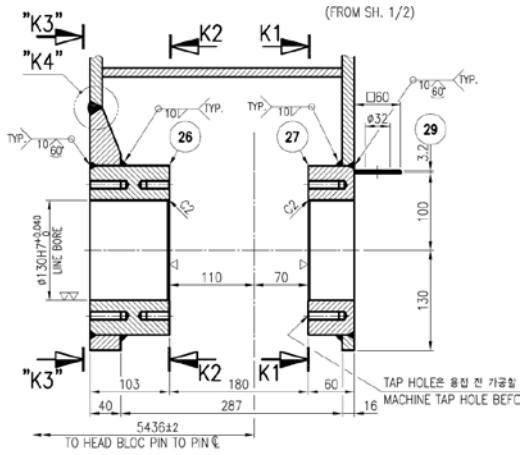
EXHIBIT
C

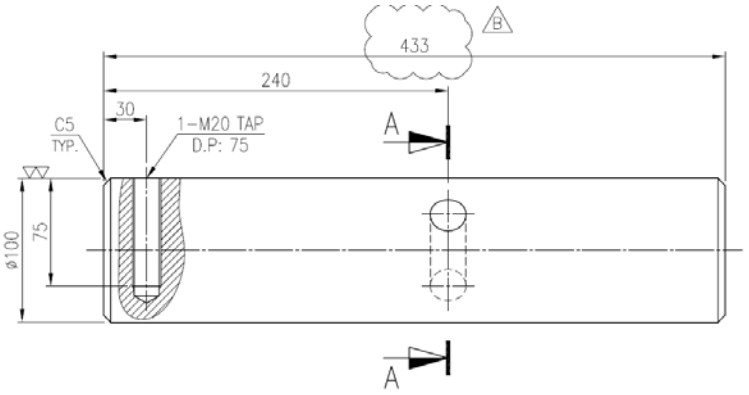
Headblock / Spreader Interface Details

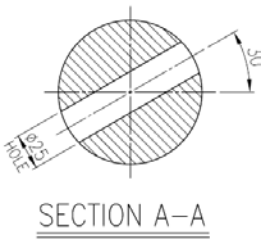




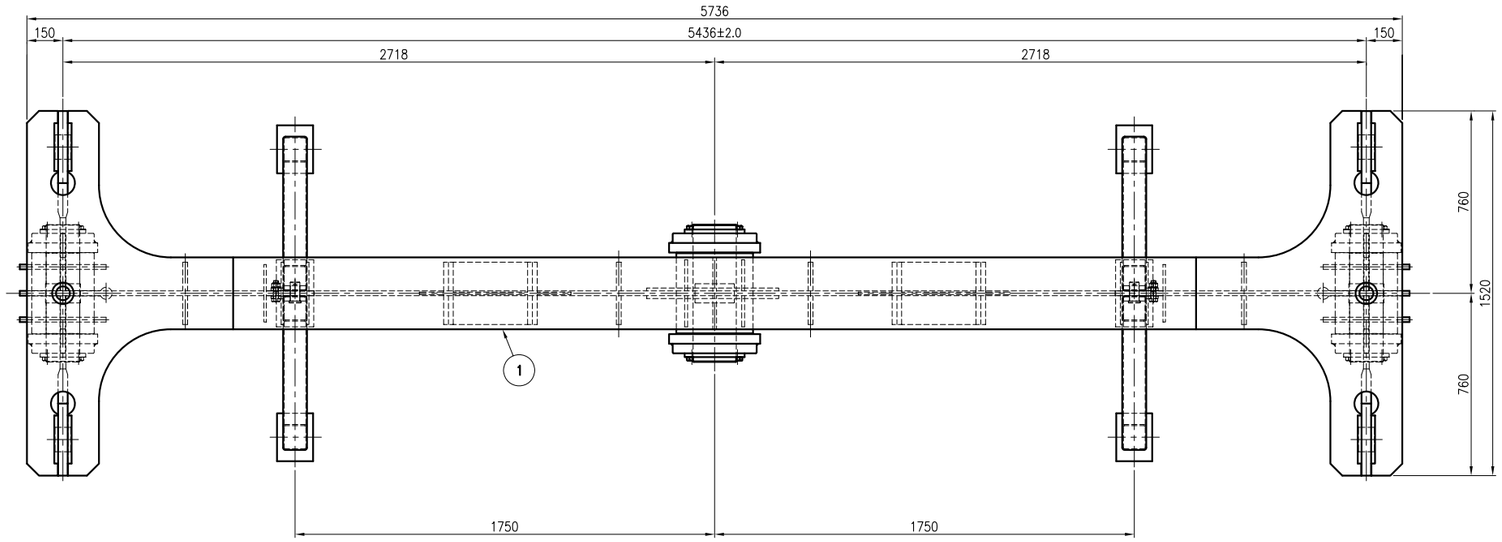


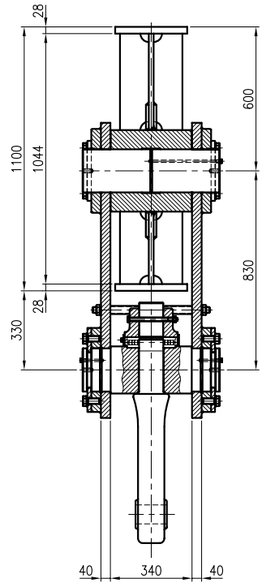






DWG NO. 1RMQ-01-56-001 (도면번호)





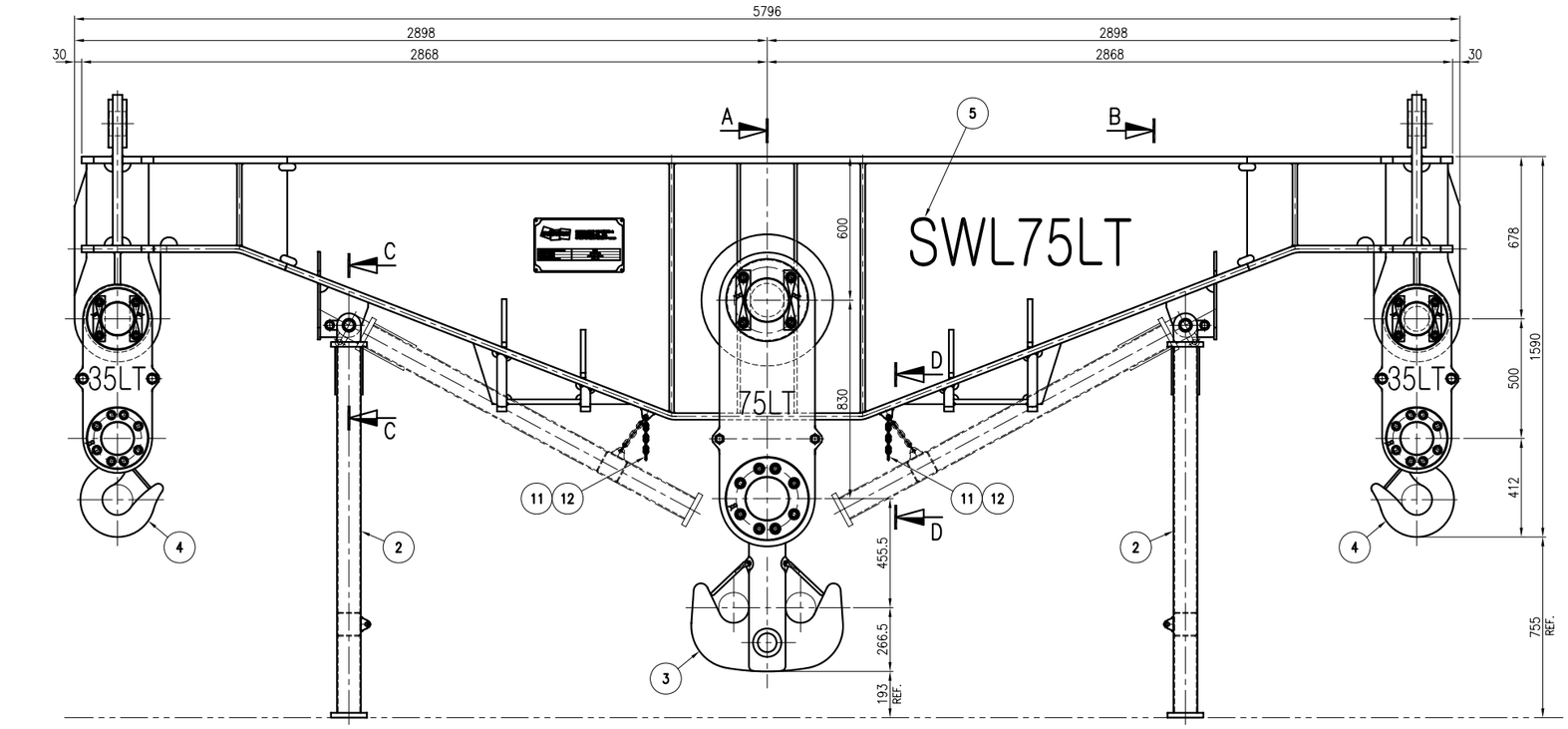
SECTION A-A

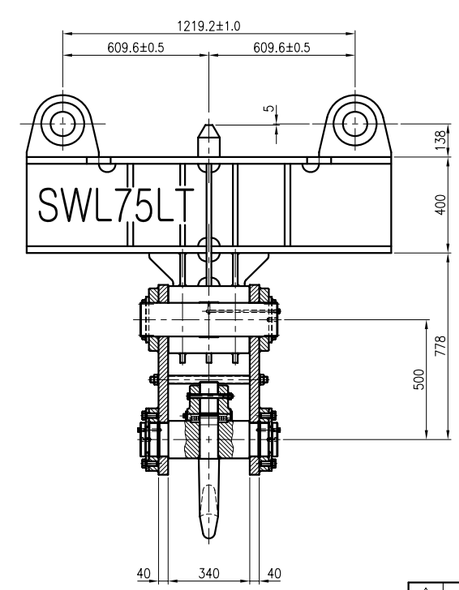
품번 NO.	품 명 DESCRIPTION	재 질 MATERIAL	수 량 Q'TY	치수, 도 번 SIZE, DWG.NO.	중 량WT.(Kg) UNIT	중 량WT.(Kg) TOTAL	비 고 REMARKS
56	**CARGO BEAM ARRANGEMENT**		**1SET**		–	5194.8	
1	CARGO BEAM FRAME		1	1RMQ-01-56-100	–	2865.4	0
2	FOLDING SUPPORT		2	2RMQ-01-56-101	80.9	161.8	
3	75 LT HOOK BLOCK ASS'Y		1	2RMQ-01-56-200	–	1029.4	
4	35 LT HOOK BLOCK ASS'Y		2	2RMQ-01-56-300	568.0	1136.0	
5	NAME PLATE		1	2RMQ-01-56-400	–	–	
6	PIN	S45C-N	2	R/B ø60x100L	1.0	2.0	
7	WASHER	SS400	2	PL6xø60	–	–	
8	HEX BOLT NUT. & P/W	Gr 8.8	2SETS	M20x75L-46S	–	–	DACRO.
9	SPLIT PIN	STAINLESS STEEL	2	ø8x50L	–	–	
10	SPLIT PIN	STAINLESS STEEL	2	ø5x35L	–	–	
11	LINK CHAIN(JIS B 2106)	STAINLESS STEEL	2	ø6-170L	0.1	0.2	
12	ROUND PIN SHACKLES	STAINLESS STEEL	4	1/4"	–	–	

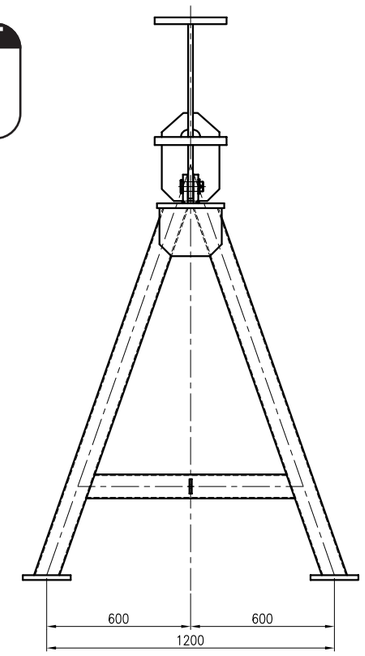
NOTE

1. MATERIAL BILLED FOR ONE(1) SET CARGO BEAM ARRANGEMENT, ONE(1) SET REQ'D PER PONO RMQC PROJECT.
(상기 물량은 CARGO BEAM ARRANGEMENT 1SET분이며, PONO RMQC PROJECT에 1SET가 필요함.)

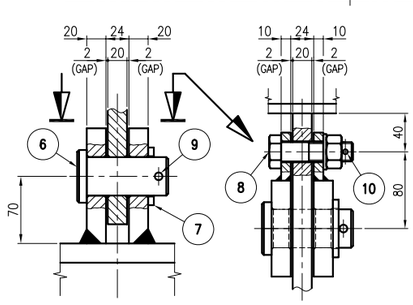
EXHIBIT D



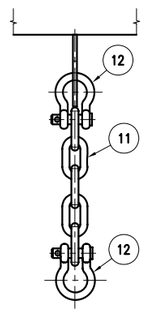




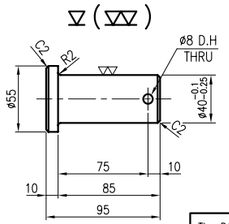
SECTION B-B



SECTION C-C



SECTION D-D



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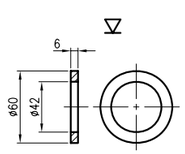
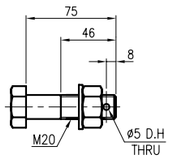


ITEM 7



ITEM 8

SURFACE ROUGHNESS COLLATION TABLE (Rm)			
Rmax		Ra	
~		√	
▽	100S	25	
	50S	12.5	
▽▽	25S	6.3	
	12.5S	3.2	
▽▽▽	6.3S	1.6	
	3.2S	0.8	
	0.8S	0.4	
▽▽▽▽	0.4S	0.2	

TIGHTENING TORQUE TABLE		
MATERIAL / SIZE	Gr 8.8	Gr 10.9
M6	12Nm	16Nm
M8	30Nm	39Nm
M10	60Nm	77Nm
M12	105Nm	134Nm
M14	–	215Nm
M16	255Nm	311Nm
M20	500Nm	650Nm
M24	870Nm	1123Nm
M27	–	1647Nm
M30	1750Nm	2233Nm
M33	–	3039Nm
M36	3050Nm	3905Nm
M42	4950Nm	–
M48	7400Nm	–
M56	11700Nm	–

REV		DESCRIPTION OF REVISION(개정 사유)
	D	CHANGED DESIGN & REVISED B.O.M
	C	REVISED CARGO BEAM SUPPORT TYPE
	B	REVISED LOADING CAPACITY
	A	FIRST ISSUE
PONO RMQC		CAD FILE NAME(파일명) : 1RMQ-01-56-001-D
APPLICATION		

REV (개정)		PREPARED BY(제도)		REVIEWED BY(검도)		APPROVED BY(승인)	
		NAME (성명)	DATE (일자)	NAME (성명)	DATE (일자)	NAME (성명)	DATE (일자)
D		D.J.LIM	2010.07.30	H.K. CHEE	2010.07.30	D.W. SEO	2010.07.30
C		D.J.LIM	2010.04.21	H.K. CHEE	2010.04.21	D.W. SEO	2010.04.21
B		D.J.LIM	2010.01.23	H.K. CHEE	2010.01.23	D.W. SEO	2010.01.23
A		S.Y. LEE	2009.12.23	H.K. CHEE	2009.12.23	D.W. SEO	2009.12.23

PROJECT (공사명)
BOARD OF COMMISSIONERS
PORT OF NEW ORLEANS
2 Rail Mounted Quayside Cranes
REQ. 050791 W.O. 1-889

DOOSAN 두산중공업주식회사 Doosan Heavy Industries & Construction Co., Ltd.

TITLE (도명): CARGO BEAM ARRANGEMENT

PROJ. (투상법)	3각법
UNIT (단위)	mm
SCALE (축척)	1/13
ITEM NO.(품류번호)	
DWG NO (도면 번호)	1RMQ-01-56-001
REV (개정)	D
SHEET (매수)	1/2

CONT. NO. (도면관리 번호)

도면 정보 보안 주의사항

본 도면 및 이에 포함된 모든내용은 두산중공업(주)의 재산이며 영업 비밀이므로 두산중공업(주) 정보자산 관리책임자의 서면허락 없이 전체 혹은 그 일부를 해당 계약수행을 위한 목적행위 외에 다른 목적으로 사용 및 무단복제 할 수 없으며, 목적행위 완료시 반드시 두산중공업(주)에 반납하여야 하고, 또한 본 도면 이용자는 제 3자에게 그 내용에 대한 기밀유지의 책임과 함께 이에 대한 제반사항 위반으로 인하여 두산중공업(주)에 손해를 입혔을 시 "영업 비밀 보호법"에 따른 책임을 져야 합니다.

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(설계/기술-3400-002) A1 (594x841mm)

EXHIBIT

E

Description	Supplier(s)
Gearing	Falk Flender Sumitomo SEW Konecranes
Brakes	Pintsch-Bubenzer Stromag (Gantry) Mayr (Trolley/auxiliary)
High speed main drive couplings	Pintsch-Bubenzer
Couplings	Pintsch-Bubenzer Falk Flender Brook-Hanson Jaure Konecranes
Drum Couplings	Malmedie Jaure Konecranes
Bearings	SKF Timken FAG NTN INA ZKL Others by request
Buffers & Bumpers	OLEO
Wire Rope	MacWhyte Bridon Casar Kiswire
Wheels	Xtek Nokian Konecranes
Trolley Rail System	Gantrex USA Konecranes
Sheaves	Xtek Gosan
Tires	Contractor standard to be reviewed
Spreader	Bromma
Maintenance Diesel Genset	Cummins Caterpillar Volvo Stanfird
Control system, drives, PLC, CMS	ABB, TMIEC, Siemens, Konecranes, Vacon
Transformers	Control system supplier
Main function motors	Control system supplier
MV Cable Reel	Cavotec Conductix-Wampfler
MV Cable, Spreader Cable	Pirelli Prysmian
Energy Chain	IGUS

	Condutix-Wampfler Brevetti
Limit switches	Turck Telemecanique Sick Schneider Electric Stromag
Operator's Cabin	Brieda Merford Konecranes
Paint	Carboline International BLP Mobile
Illumination	Phoenix GE
Communication	Gaitronics
CCTV	Orlaco
Load Monitoring	PAT Tecsis
Air Compressor	Ingersoll-Rand
Crane Anti-Collision System	SICK

LOUISIANA UNIFORM PUBLIC WORK BID FORM

TO: Board of Commissioners Port of New Orleans
1350 Port of New Orleans Place
P.O. Box 60046
New Orleans, LA 70160

BID FOR: Mississippi River Intermodal Terminal Electric Rubber Tire Gantry Crane Procurement

Requisition Number 071952 W. O. 1-109

The undersigned bidder hereby declares and represents that she/he; a) has carefully examined and understands the Bidding Documents, b) has not received, relied on, or based his bid on any verbal instructions contrary to the Bidding Documents or any addenda, c) has personally inspected and is familiar with the project site, and hereby proposes to provide all labor, materials, tools, appliances and facilities as required to perform, in a workmanlike manner, all work and services for the construction and completion of the referenced project, all in strict accordance with the Bidding Documents prepared by: AECOM Technical Services, Inc. and dated 22 October 2014.

Bidders must acknowledge all addenda. The Bidder acknowledges receipt of the following **ADDENDA:** (Enter the number the Designer has assigned to each of the addenda that the Bidder is acknowledging) Addendum No. 1 and No. 2 .

TOTAL BASE BID: For all work required by the Bidding Documents (including any and all unit prices designated "Base Bid" * but not alternates) the sum of:

Five million three hundred forty thousand only Dollars ($ 5,340,000.00)

ALTERNATES: For any and all work required by the Bidding Documents for Alternates, including any and all unit prices designated as alternates in the unit price description.

Alternate No. 1 Supply of alternate spreaders per Specification Section 5.4. Add the lump sum of:

One hundred forty thousand only Dollars ($ 140,000.00)

Alternate No. 2 Supply containers for spare parts and tools per Specification Sections 14.8 and 29.4. Add the lump sum of:

_____ Dollars ($ _____)

Alternate No. 3 (Describe the alternate) (Add) (Deduct) the lump sum of:

N/A Dollars ($ N/A)

NAME OF BIDDER: Konecranes Finland Corporation

ADDRESS OF BIDDER: Koneenkatu 8
FI-05801 Hyvinkaa, Finland

NAME OF AUTHORIZED SIGNATORY OF BIDDER: Richard A Russell

TITLE OF AUTHORIZED SIGNATORY OF BIDDER: Sales Director, Port Cranes, North America

SIGNATURE OF AUTHORIZED SIGNATORY OF BIDDER **: _____

DATE: December 1, 2014

* The Unit Price Form shall be used if the contract includes unit prices. Otherwise it is not required and need not be included with the form. The number of unit prices that may be included is not limited and additional sheets may be included if needed.

** If someone other than a corporate officer signs for the Bidder/Contractor, a copy of a corporate resolution or other signature authorization shall be required for submission of bid. Failure to include a copy of the appropriate signature authorization, if required, may result in the rejection of the bid unless bidder has complied with La. R.S. 38:2212(A)(1)(c) or RS 38:2212(O) .

BID SECURITY in the form of a bid bond, certified check or cashier's check as prescribed by LA RS 38:2218.A is attached to and made a part of this bid.

READ PUBLICLY
RECORDED
VERIFIED

POWER OF ATTORNEY

KNOW ALL MEN BY THESE PRESENTS, that we Konecranes Finland Corporation, a corporation organized and existing under the laws of Finland with its head office at Koneenkatu 8, FI-05800 Hyvinkää, Finland do hereby nominate, constitute and appoint Mr. Jussi Suhonen or Mr. Thomas P Gilchrist or Mr. Richard Russell as our true and lawful attorney in fact, for us and in our name, place and stead to sign the bid bond and tender documents for Port of New Orleans project.

IN WITNESS WHEREOF, Konecranes Finland Corporation has caused this Power of Attorney to be executed by its authorized representatives this 27th of November 2014 and it is valid for the time being.

Konecranes Finland Corporation

Hyvinkää, Finland November 27th, 2014

Timo Valkonen
Director

Juha Vanhanen
Director

Bid Bond No.8132-73-37-I

BID BOND

BID FOR: Mississippi River Intermodal Terminal Improvements
Electric Rubber Tire Gantry Crane Procurement

Requisition Number 071952 Work Order 1-109

Date: November 25, 2014

KNOW ALL MEN BY THESE PRESENTS:

That Konecranes Finland Corporation, Koneenkatu 8, FI-05801 Hyvinkaa, Finland, as Principal, and Federal Insurance Company as Surety, are held and firmly bound unto the Board of Commissioners of the Port of New Orleans (Obligee), in the full and just sum of five (5%) percent of the cost of the contract price of work to be done for the Base Bid price, lawful money of the United States, for payment of which sum, well and truly be made, we bind ourselves, our heirs, executors, administrators, successors and assigns, jointly and severally firmly by these presents.

Surety represents that it is listed on the current U. S. Department of the Treasury Financial Management Service list of approved bonding companies as approved for an amount equal to or greater that the amount for which it obligates itself in this instrument or that it is a Louisiana domiciled insurance company with at least an A - rating in the latest printing of the A. M. Best's Key Rating Guide. If surety qualifies by virtue of its Best's listing, the Bond amount may not exceed ten percent of policyholders' surplus as shown in the latest A. M. Best's Key Rating Guide.

Surety further represents that it is licensed to do business in the State of Louisiana and that this Bond is signed by surety's agent or attorney-in-fact. This Bid Bond is accompanied by appropriate power of attorney.

THE CONDITION OF THIS OBLIGATION IS SUCH that, whereas said Principal is herewith submitting its proposal to the Obligee on a Contract for: **Mississippi River Intermodal Terminal Improvements - Electric Rubber Tire Gantry Crane Procurement - work order 1-109**

NOW, THEREFORE, if the said Contract be awarded to the Principal and the Principal shall, within such time as may be specified, enter into the Contract in writing and give a good and sufficient bond to secure the performance of the terms and conditions of the Contract with surety acceptable to the Obligee, then this obligation shall be void; otherwise this obligation shall become due and payable.

KONECRANES FINLAND CORPORATION	FEDERAL INSURANCE COMPANY
PRINCIPAL (BIDDER)	SURETY
BY: _____	BY: Maria Scardigno
AUTHORIZED OFFICER-OWNER-PARTNER	AGENT OR ATTORNEY-IN-FACT (SEAL)
	Maria Scardigno, Attorney-in-fact

ATTESTATION CLAUSE REQUIRED BY
LA. R.S. 38:2227 (PAST CRIMINAL CONVICTIONS OF BIDDERS)

Sworn statements shall be submitted in the form of an affidavit as indicated below, executed and sworn to by the bidder before persons authorized by laws of the State to administer oaths. The original of such sworn statement shall be submitted by the successful bidder before the Award of Contract. The award of Contract shall be within (__) calendar days of the bid opening.

State Project Number: Req. No. 071952 W.O. 1-109 (if applicable)

Name of Project: Mississippi River Intermodal Yard Improvements Electric Rubber Tire Gantry Crane Procurement

Parish: Orleans

Konecranes Finland Corporation (an individual) (a partnership) (a corporation)

certify that:

Appearer, as a Bidder on the above-entitled Public Works Project, does hereby attest that:

A. No sole proprietor or individual partner, incorporator, director, manager, officer, organizer, or member who has a minimum of a ten percent (10%) ownership in the bidding entity named below has been convicted of, or has entered a plea of guilty or nolo contendere to, any of the following state crimes or equivalent federal crimes:

(a) Public bribery (R.S. 14:118)
(b) Corrupt influencing (R.S. 14:120)
(c) Extortion (R.S. 14:66)
(d) Money laundering (R.S. 14:23)

B. Within the past five years from the project bid date, no sole proprietor or individual partner, incorporator, director, manager, officer, organizer, or member who has a minimum of a ten percent (10%) ownership in the bidding entity named below has been convicted of, or has entered a plea of guilty or nolo contendere to any of the following state crimes or equivalent federal crimes, during the solicitation or execution of a contract or bid awarded pursuant to the provisions of Chapter 10 of Title 38 of the Louisiana Revised Statutes:

(a) Theft (R.S. 14:67)
(b) Identity Theft (R.S. 14:67.20)
(c) Theft of a business record (R.S. 14:67.20)
(d) False accounting (R.S. 14:70)
(e) Issuing worthless checks (R.S. 14:71)
(f) Bank fraud (R.S. 14:71.1)
(g) Forgery (R.S. 14:72)
(h) Contractors; misapplication of payments (R.S. 14:202)
(i) Malfeasance in office (R.S. 14:134)

Konecranes Finland Corp.
Name of Bidder

December 10, 2014
Date

Richard A Russell
Name of Authorized Signatory of Bidder

Sales Director, Port Cranes, North America
Title of Authorized Signatory of Bidder

Signature of Authorized Signatory Bidder

WITNESSES:

Carolyn Morgan

Joel Vicioso

Parish or county Essex

State of New Jersey

Subscribed and sworn to before me this 10th day of December, 2014

Nadia Chaudry
Notary Public
New Jersey
My Commission Expires 4-10-19
No. 2444621

Nadia Chaudry
NOTARY PUBLIC (signature)

Nadia Chaudry
NOTARY PUBLIC (printed name)

2444621
NOTARY PUBLIC NUMBER

04-10-19
EXPIRATION DATE

NON COLLUSION DECLARATION

A sworn statement shall be submitted in the form of an affidavit as indicated below, executed and sworn to by the bidder before persons authorized by laws of the State to administer oaths. The original of such sworn statement shall be submitted by the successful bidder after the Award of Contract.

Affidavit

State Project Number: Req. No. 071952 W.O. 1-109 (if applicable)

Name of Project: Mississippi River Intermodal Yard Improvements Electric Rubber Tire Gantry Crane Procurement

Parish: Orleans

Konecranes Finland Corporation (an individual) (a partnership) (a corporation)

certify that:

(1) That affiant employed no person, corporation, firm, association, or other organization, either directly or indirectly, to secure the public contract under which he received payment, other than persons regularly employed by the affiant whose services in connection with the construction, alteration or demolition of the public building or project or in securing the public contract were in the regular course of their duties for affiant, and

(2) That no part of the contract price received by affiant was paid or will be paid to any person, corporation, firm, association, or other organization for soliciting the contract, other than the payment of their normal compensation to persons regularly employed by the affiant whose services in connection with the construction, alteration or demolition of the public building or project were in the regular course of their duties for affiant.

(an individual) (a partnership) (a corporation)

WITNESSES:

Signed Konecranes Finland Corp.

By Richard A Russell

Title Sales Director, Port Cranes, North America

Parish or county Essex

State of New Jersey

Subscribed and sworn to before me this 10th day of December, 2014.

Nadia Chaudry
Notary Public
New Jersey
My Commission Expires 4-10-1
No. 2444621

NOTARY PUBLIC (signature)

Nadia Chaudry
NOTARY PUBLIC (printed name)

2444621 NOTARY PUBLIC NUMBER

04-10-19 EXPIRATION DATE

AFFIDAVIT OF USE OF STATUS VERIFICATION SYSTEM

PURSUANT TO La. R.S. 38:2212.10C, a private employer shall not bid on or otherwise contract with a public entity for the physical performance of services within the state of Louisiana unless the private employer verifies in a sworn affidavit that the private employer is registered with, participates in, and utilizes the status verification system required by La. R.S. 38:2212.10B(2), known as the "E-Verify" program, in accordance with federal rules and regulations pertaining to E-Verify.

Name of Private Employer: Konecranes, Inc.

Name of Authorized Agent: Melissa S. Young

Mailing Address: 4401 Gateway Blvd.
Springfield, OH 45502

ATTESTATION

I hereby attest that Konecranes, Inc.:
(name of private employer)

1. Is registered with and participates in the status verification system to verify that all new employees in the state of Louisiana are legal citizens of the United States or are legal aliens.

2. Will continue, during the term of the contract, to utilize the status verification system to verify the legal status of all new employees in the state of Louisiana.

3. Will require all subcontractors to submit an affidavit verifying that the subcontractor is registered with, participates in, and utilizes the status verification system to verify the legal status of all new employees in the State of Louisiana.

CERTIFICATE OF ACCURACY

I hereby certify that the information herein is true and correct to the best of my knowledge, information, and belief.

Melissa S. Young
Signature (Authorized Agent)

Sworn To And Subscribed, before me, this 26 day of September, 20~~14~~16, in Springfield, ~~Louisiana~~ Ohio | Clark

NOTARIAL SEAL
STATE OF OHIO
Reg. No. 07[illegible]

ANITA I. NIRIDER
Notary Public
Notary Public, State of Ohio
My Commission Expires
August 17, 2016

Bond No.8304-31-73

BOND

TO THESE PRESENTS NOW COMES AND INTERVENES **Federal Insurance Company**, a Surety Company duly authorized to do and doing business in the State of Louisiana, and the City of New Orleans, (hereinabove and hereinafter sometimes referred to as Surety) and which binds and obligates itself jointly, severally and solido, with said **Konecranes Finland Corporation**, as Contractor herein, to and in favor of BOARD OF COMMISSIONERS OF THE PORT OF NEW ORLEANS, in the sum of Four Million Eight Hundred Fifty Thousand and 00/100-----Dollars ($4,850,000.00) for the faithful and satisfactory performance by Contractor of all of the obligations assumed by, or imposed upon, Contractor in this agreement for **Mississippi River Intermodal Terminal Improvements – Electric Rubber Tire Gantry Crane Procurement – work order 1-109**, and the payment by Contractor for all work done, labor performed and material furnished under this agreement, in accordance with the Louisiana Revised Statues of 1950, Title 38, Section 2241, et sequitur, or as the same may be otherwise supplemented and amended. The condition of this obligation is such that if Contractor, shall well, truly, faithfully and satisfactorily perform all of the obligations assumed by, or imposed upon, Contractor by this agreement, as provided for and included within the terms of said Louisiana Revised Statutes of 1950, and Contractor and all sub-contractors shall pay for all work done, labor performed or materials or supplies to the site of the job by a for hire carrier, or for furnishing materials or supplies for use in any machines used in connection with said agreement, that this obligation shall be null and void and of no effect; otherwise, it shall remain in full force and effect, aqnd no modifications, omissions, or additions, in or to the terms of said agreement, or in or the Plans, Specifications an Bid, or in the manner and mode of payment shall in any manner affect the obligations of Surety.

Surety hereby consents and yields to the jurisdiction of the Civil District Court in and for the Parish of Orleans, State of Louisiana, and hereby waives any plea to the jurisdiction on account of residence of domicile elsewhere, the event of suit under this agreement and bond, and Surety herein shall be limited to such defenses only as Contractor could make.

Signed, Sealed and Dated this 9 th day of December, 2014.

KONECRANES FINLAND CORPORATION	FEDERAL INSURANCE COMPANY
CONTRACTOR	SURETY
By: _____	By: Maria Scardigno
Authorized Officer – Owner - Partner	Maria Scardigno, Attorney-In-Fact

IN WITNESS WHEREOF, the parties hereto have executed this agreement, including Appendix A "Further Agreement Between the Parties to Specification Changes" dated December 9, 2014 and the First Amendment to Appendix A dated December 19, 2014, attached hereto and made a part thereof, in multiple originals in the places and on the dates hereafter set forth to be effective on the last date executed by a party hereto.

BOARD OF COMMISSIONERS OF THE
PORT OF NEW ORLEANS

WITNESSES:

BY: _____
GARY P. LAGRANGE
PRESIDENT & CEO

Jeanne Moran

Wandalyn Stokes

DATE: 1-6-15
in New Orleans, Louisiana

KONECRANES FINLAND CORPORATION

WITNESSES:

BY: _____
(signature)

_____ 1

R A Russell
(printed)

_____ 2

Sales Director
(title)

DATE: 12-29-14

IN: West Caldwell, NJ

Chubb Surety

POWER OF ATTORNEY

Federal Insurance Company
Vigilant Insurance Company
Pacific Indemnity Company

Attn: Surety Department
15 Mountain View Road
Warren, NJ 07059

Know All by These Presents, that **FEDERAL INSURANCE COMPANY,** an Indiana corporation, **VIGILANT INSURANCE COMPANY,** a New York corporation, and **PACIFIC INDEMNITY COMPANY,** a Wisconsin corporation, do each hereby constitute and appoint Richard W. Barnett, Jane M. Bender, Scott W. Bishop, Stephen B. Bradt, Dekker Buckley, Dawn M. Chloros, Richard A. Ciullo, Deborah S. Colarell, Brenda C. Cousins, Catherine Donahue, Maria Edelmann, Karen A. Eder, Warren E. Eichhorn, Donté Evans, Tina M. Hawkins, Patricia A. Johnson, Stacy J. Loftin, Krystyna Lozier, Matthew E. Lubin, Heather Monsell, Christopher T. Parker, Michele Pavlik, Donna M. Powers, Maria Scardigno, Brian C. Sheridan, Dolores Sheridan, Maria F. Sintra, Kathye E. Smith, Donna Marie Thomas, Barbara Varju and Kevin M. Waldron of Warren, New Jersey each as their true and lawful Attorney- in- Fact to execute under such designation in their names and to affix their corporate seals to and deliver for and on their behalf as surety thereon or otherwise, bonds and undertakings and other writings obligatory in the nature thereof (other than bail bonds) given or executed in the course of business, and any instruments amending or altering the same, and consents to the modification or alteration of any instrument referred to in said bonds or obligations.

In Witness Whereof, said **FEDERAL INSURANCE COMPANY, VIGILANT INSURANCE COMPANY,** and **PACIFIC INDEMNITY COMPANY** have each executed and attested these presents and affixed their corporate seals on this **30th** day of **September, 2014.**

David J. Edwards, Assistant Secretary

David B. Norris, Jr., Vice President

STATE OF NEW JERSEY
ss.
County of Somerset

On this **30th** day of **September, 2014** before me, a Notary Public of New Jersey, personally came David J. Edwards, to me known to be Assistant Secretary of FEDERAL INSURANCE COMPANY, VIGILANT INSURANCE COMPANY, and PACIFIC INDEMNITY COMPANY, the companies which executed the foregoing Power of Attorney, and the said David J. Edwards, being by me duly sworn, did depose and say that she is Assistant Secretary of FEDERAL INSURANCE COMPANY, VIGILANT INSURANCE COMPANY, and PACIFIC INDEMNITY COMPANY and knows the corporate seals thereof, that the seals affixed to the foregoing Power of Attorney are such corporate seals and were thereto affixed by authority of the By- Laws of said Companies; and that she signed said Power of Attorney as Assistant Secretary of said Companies by like authority; and that she is acquainted with David B. Norris, Jr., and knows him to be Vice President of said Companies; and that the signature of David B. Norris, Jr., subscribed to said Power of Attorney is in the genuine handwriting of David B. Norris, Jr., and was thereto subscribed by authority of said By- Laws and in deponent's presence.

Notarial Seal

KATHERINE J. ADELAAR NOTARY PUBLIC NEW JERSEY

KATHERINE J. ADELAAR
NOTARY PUBLIC OF NEW JERSEY
No. 2316685
Commission Expires July 16, 2019

Notary Public

CERTIFICATION

Extract from the By- Laws of FEDERAL INSURANCE COMPANY, VIGILANT INSURANCE COMPANY, and PACIFIC INDEMNITY COMPANY:

"All powers of attorney for and on behalf of the Company may and shall be executed in the name and on behalf of the Company, either by the Chairman or the President or a Vice President or an Assistant Vice President, jointly with the Secretary or an Assistant Secretary, under their respective designations. The signature of such officers may be engraved, printed or lithographed. The signature of each of the following officers: Chairman, President, any Vice President, any Assistant Vice President, any Secretary, any Assistant Secretary and the seal of the Company may be affixed by facsimile to any power of attorney or to any certificate relating thereto appointing Assistant Secretaries or Attorneys- in- Fact for purposes only of executing and attesting bonds and undertakings and other writings obligatory in the nature thereof, and any such power of attorney or certificate bearing such facsimile signature or facsimile seal shall be valid and binding upon the Company and any such power so executed and certified by such facsimile signature and facsimile seal shall be valid and binding upon the Company with respect to any bond or undertaking to which it is attached."

I, David J. Edwards, Assistant Secretary of FEDERAL INSURANCE COMPANY, VIGILANT INSURANCE COMPANY, and PACIFIC INDEMNITY COMPANY (the "Companies") do hereby certify that

(i) the foregoing extract of the By- Laws of the Companies is true and correct,
(ii) the Companies are duly licensed and authorized to transact surety business in all 50 of the United States of America and the District of Columbia and are authorized by the U.S. Treasury Department; further, Federal and Vigilant are licensed in the U.S. Virgin Islands, and Federal is licensed in American Samoa, Guam, Puerto Rico, and each of the Provinces of Canada except Prince Edward Island; and
(iii) the foregoing Power of Attorney is true, correct and in full force and effect.

Given under my hand and seals of said Companies at Warren, NJ this 9th day of December, 2014.

David J. Edwards, Assistant Secretary

IN THE EVENT YOU WISH TO NOTIFY US OF A CLAIM, VERIFY THE AUTHENTICITY OF THIS BOND OR NOTIFY US OF ANY OTHER MATTER, PLEASE CONTACT US AT ADDRESS LISTED ABOVE, OR BY Telephone (908) 903- 3493 Fax (908) 903- 3656 e-mail: surety@chubb.com

APPENDIX A

FURTHER AGREEMENT BETWEEN THE PARTIES TO SPECIFICATION CHANGES
DECEMBER 9, 2014

MISSISSIPPI RIVER INTERMODAL TERMINAL IMPROVEMENTS
ELECTRIC RUBBER TIRE GANTRY CRANE PROCUREMENT
REQ. NO. 071952, WORK ORDER NO. 1-109

The Board of Commissioners of the Port of New Orleans (hereafter "Board") and Konecranes Finland Corporation (hereafter "Konecranes"), hereby agree that the Total Base Bid below replaces the items and prices filled in the Louisiana Uniform Public Work Bid Form in the contract for the referenced project (hereafter "Contract"). Any references in the Contract to the contractor's bid shall now refer to the price below.

The Board and Konecranes further agree to the modifications and clarifications to the technical specifications as described in Exhibit 1, dated December 9, 2014, attached hereto and made a part thereof.

TOTAL BASE BID: For all work required by the Bidding Documents (including Addendum #1, Addendum #2, and Exhibit 1 to this Appendix A) the sum of: $4,850,000.00.

ACCEPTED AND AGREED

BOARD OF COMMISSIONERS OF THE PORT OF NEW ORLEANS

Gary P. LaGrange
President and Chief Executive Officer

1-6-15
(date)

KONECRANES FINLAND CORPORATION

(signed)

RA Russell
(printed)

Sales Director
(title)

12-24-14
(date)

FIRST AMENDMENT TO APPENDIX A

FURTHER AGREEMENT BETWEEN THE PARTIES TO SPECIFICATION CHANGES
DECEMBER 19, 2014

MISSISSIPPI RIVER INTERMODAL TERMINAL IMPROVEMENTS
ELECTRIC RUBBER TIRE GANTRY CRANE PROCUREMENT
REQ. NO. 071952, WORK ORDER NO. 1-109

The Board of Commissioners of the Port of New Orleans (hereafter "Board") and Konecranes Finland Corporation (hereafter "Konecranes"), hereby agree that Appendix A dated December 9, 2014 to the contract for the referenced project (hereafter "Contract") is hereby amended to include further modifications to the specifications of the Contract as described in Exhibit 1, dated December 19, 2014, attached hereto and made a part thereof.

The Board and Konecranes further agree that the Total Base Bid shown in Appendix A dated December 9, 2014 shall remain unchanged at $4,850,000.00 for all work required by the Bidding Documents (including Addendum #1, Addendum #2, Exhibit 1 to Appendix A dated December 9, 2014, and Exhibit 1 to this First Amendment to Appendix A dated December 19, 2014).

ACCEPTED AND AGREED

BOARD OF COMMISSIONERS OF THE PORT OF NEW ORLEANS

Gary P. LaGrange
President and Chief Executive Officer

1-6-15
(date)

KONECRANES FINLAND CORPORATION

(signed)

RA Russell
(printed)

Sales Director
(title)

12-24-14
(date)

EXHIBIT 1
TO
FIRST AMENDMENT TO APPENDIX A
DECEMBER 19, 2014

1. The following paragraph is added to Article 26 (Warranty) of the General Conditions of the Contract:

   The warranties set forth in this Article 26 represent the sole and exclusive warranties given by Contractor to the Board with respect to the goods and/or services provided under the Contract Documents and are in lieu of and exclude all other warranties, express or implied arising by operation of law or otherwise, including, but not limited to, any implied warranties of merchantability.

2. Article 27 (Indemnity) of the General Conditions of the Contract is hereby deleted in its entirety, and the following is added in its place:

   ARTICLE 27 - INDEMNITY

   Contractor shall protect, defend, indemnify, and keep, save, and hold harmless the Board from any and all loses, costs, claims, damages, demands, attorney's fees, expenses, penalties , fines, suits and actions of any kind and nature arising out of any Contractor's negligent acts or omissions, causing injury including death, to any person or persons or damage to property, directly or indirectly caused by, resulting from, or growing out of the performance of his obligations under this contract, whether caused by his affiliates, his subsidiaries or his employees, servants, agents, representatives or subcontractors, including such as may be imposed for the violation of any law, ordinance, or regulation (federal, state or local); and Contractor shall defend and indemnify the Board from and against any and all costs and expenses in connection with the foregoing, including court costs, related litigation expenses, and reasonable attorney's fees that may be incurred by the Board, provided however, that nothing herein shall be construed as indemnifying the Board against its own negligence or willful misconduct or that of its officers, agents, servants, or employees when such negligence or willful misconduct is the direct cause or a contributing cause of such loss, damage, injury or death. Furthermore, Contractor shall be liable for attorney's fees and costs incurred by the Board if it must file suit or retain counsel and if it is successful in enforcing the terms of this indemnity. The Board shall notify Contractor of any claim, demand, suit or other action brought or raised against the Board for which Contractor may be

liable as stated above. The provisions of this indemnity shall survive this Contractor and are intended to be severable. If any term or provision should be determined invalid or unenforceable for any reason, that invalidity or unenforceability shall not affect the validity or enforceability of the remainder of the terms of this indemnity.

3. Article 30 (Performance Bond And Continuing Obligations) of the General Conditions of the Contract is hereby deleted in its entirety, and the following is added in its place:

ARTICLE 30 - PERFORMANCE BOND AND CONTINUING OBLIGATIONS

Contractor shall furnish a good and solvent bond either in the form attached hereto and forming part of this contract or on a form acceptable to Board to insure prompt and proper performance of all of the obligations imposed on Contractor under the contract in an amount equal to the total amount of the contract, except as provided under La. R.S. 38:2216(C). The bond shall be cancelled and the surety released only in accordance with the provisions of law and of this contract.

Under the bond and as a guarantee against faulty materials or workmanship and the negligence of Contractor, the responsibility of Contractor and Surety shall continue for a period of forty-five (45) days after Contractor's acceptance of the Final Completion certificate per Section 26.4 of the Technical Specifications, after which time the bond shall be null and void. Consistent with its obligations arising under this Contract, Contractor shall, at its expense, remedy any and all defects which appear after issuance of certificate of completion (with respect to the particular portion of the work affected if certificate of completion was issued for that portion separately from the whole of the work) or after final acceptance as the case may be, and Contractor shall replace defective materials and equipment and shall pay for all damage to other work resulting therefrom. Board shall give notice to Contractor of any and all observed defects with reasonable promptness.

4. The following article is hereby added to the General Conditions of the Contract as Article 48:

ARTICLE 48 – LIMITATION OF LIABILITIES

Notwithstanding any provision in the Contract Documents to the contrary, Contractor shall have no liability to Board with respect to the sale of products or provision of services under the Contract Documents for lost of profits or for special, consequential, exemplary or incidental damages of any kind whether arising in Contract, tort, product liability or

otherwise, even if Contractor was advised of the possibility of such lost profits or damages. In no event shall Contractor be liable to Board for any damages whatsoever in excess of the limit of the applicable insurance as required in the Contract Documents.

ACKNOWLEDGMENTS

STATE OF LOUISIANA
PARISH OF ORLEANS

On this 10th day of December, 2014, before me personally came and appeared Gary P. LaGrange, to me known, who being by me duly sworn, did depose and say that he is the President and CEO of the Board of Commissioners of the Port of New Orleans, the political subdivision of the State of Louisiana described in and which executed the foregoing contract; and that he signed his name thereto pursuant to authority granted to him by the Board of Commissioners of Port of New Orleans; and that said instrument is the full and free act and deed of Board of Commissioners of the Port New Orleans.

And the said Gary P. LaGrange did further produce to me sufficient proof that he is the President and CEO of said Board of Commissioners of the Port of New Orleans and that he was duly authorized by Board of Commissioners of the Port of New Orleans to execute the foregoing instrument, and I, the Notary Public, hereby certify that the signature of said Gary P. LaGrange on the foregoing instrument is authentic.

Joseph W. Fritz Jr.
NOTARY PUBLIC (signature)

JOSEPH W. FRITZ, JR.
NOTARY PUBLIC (printed name)
NOTARY PUBLIC
Bar # 5755
Parish of Jefferson, State of Louisiana
My Commission is issued for Life
NOTARY PUBLIC NUMBER EXPIRATION DATE

STATE OF LOUISIANA
PARISH OF ORLEANS

On this 24th day of December, 2014, before me personally came and appeared Richard A. Russell, Sales Director, to me known, who, being duly sworn, did depose and say that he is Sales Director of Konecranes Finland Corporation, described in and which executed the foregoing contract; and that he signed his name thereto pursuant to authority granted to Konecranes Finland Corporation and that said instrument is the full and free act and deed of Konecranes Finland Corporation.

And the said Richard A. Russell did further produce to me sufficient proof that he is Sales Director and that he was dully authorized of Konecranes Finland Corporation to execute the foregoing instrument, and I, the Notary Public, hereby certify that the signature of said Richard A. Russell is authentic.

NOTARY PUBLIC (signature)

Jaime Fuentes
NOTARY PUBLIC (printed name)

No. 2433824
NOTARY PUBLIC NUMBER

5/13/18
EXPIRATION DATE

Jaime S Fuentes
Notary Public
New Jersey
My Commission Expires May 13, 2018
No. 2433824

Req. No. 071952